THE IRON AGE

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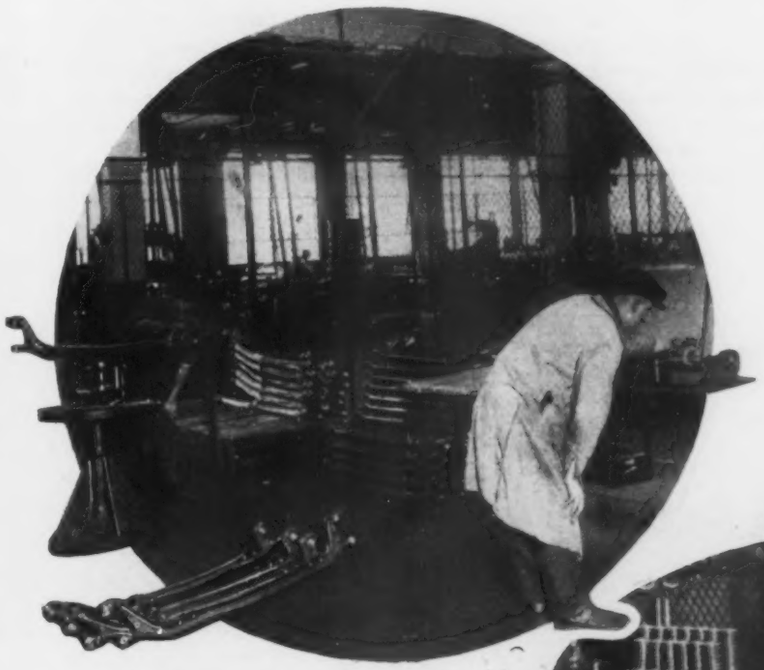
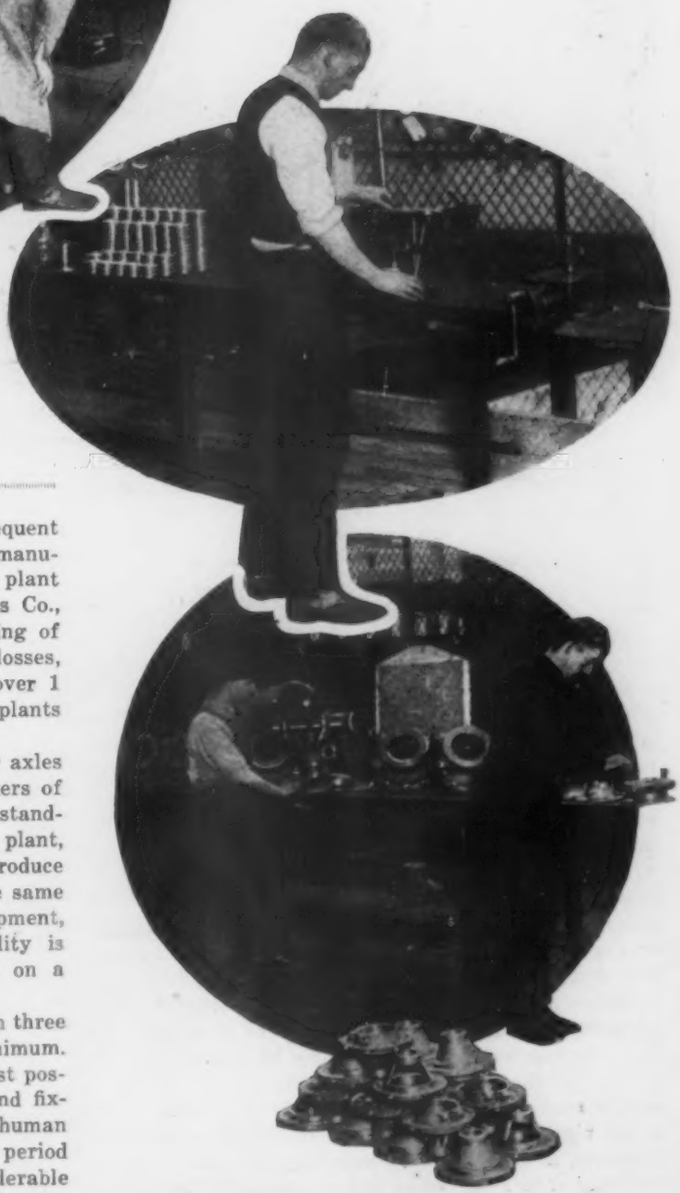
Inspection the Keynote in Axle Plant

Its Economy Shown in Holding Rejections of Finished Axles Below One Per Cent





Above Is a Portion of the Inspection Department; the Man Is Checking the Degrees of Angle on the Steering Knuckle, on a Fixture Designed for That Purpose

At Right the Hardness Test Is Being Made on a Wills King Pin by Means of a Scleroscope

In the Lower View a Cadillac Differential Carrier Is Being Checked for Alinement, with a Test Fixture and a Starrett Dial Indicator, to 0.005 In. Limit

CLOSE inspection of raw material and frequent and rigid inspection of work in process of manufacture are predominating features at the plant of the Eaton axle division of the Standard Parts Co., Cleveland. This inspection with frequent checking of jigs and fixtures has resulted in reducing scrap losses, due to the rejection of defective parts, to not over 1 per cent. It is said that the usual scrap losses in plants of this type run from 2 to 2½ per cent.

In the plant are manufactured front and rear axles for some of the high priced motor cars, the makers of which demand axles of the highest quality. This standard is adhered to in all the output of the Eaton plant, as the management feels that any attempt to produce both high grade and medium quality axles in the same plant, and with the same workmen and equipment, would not prove successful. While high quality is maintained, the plant is nevertheless operated on a fairly large production basis.

The plant management takes into consideration three main factors, to reduce its scrap losses to a minimum. It endeavors (1) to keep its machinery in the best possible condition, (2) frequently checks its jigs and fixtures with blue prints and (3) considers the human element of the utmost importance. During the period of depression, when labor was plentiful, considerable

attention was devoted to building up a force of skilled workmen.

By a careful inspection of raw material, defects when existing are generally found before much work has been expended in machining operations, and thus is avoided later scrapping from this cause. Every piece that goes through the plant is given for inspections. First, the rough piece is inspected, then there is a field inspection during operation, and after the part is finished it is given 100 per cent inspection. Finally there is an inspection of the finished axle after assembling.

Rough malleable castings for the rear axles, such as differential carriers, brake supports, etc., on receipt are given a visual inspection for cracks, blow holes, sand holes and warping. The larger forgings such as I-beams for front axles are first given a rough grinding and polishing, when any defects in forging the steel will show up. Pieces having defects are thrown out and the remainder, with the smaller forged parts, are sent to the heat treating department. After heat treating they are tested for hardness on a Brinell testing machine.

Inspection of all the largest parts is done on special layout benches located in the rough stockroom, the machine shop and the final inspection department. The rough inspection shows whether a casting or forging will clean up properly in machining. If it will not, the part is rejected. Surface gages, indicators, squares, dimension gages and bench centers are used as required for the various inspection work on the rough parts.

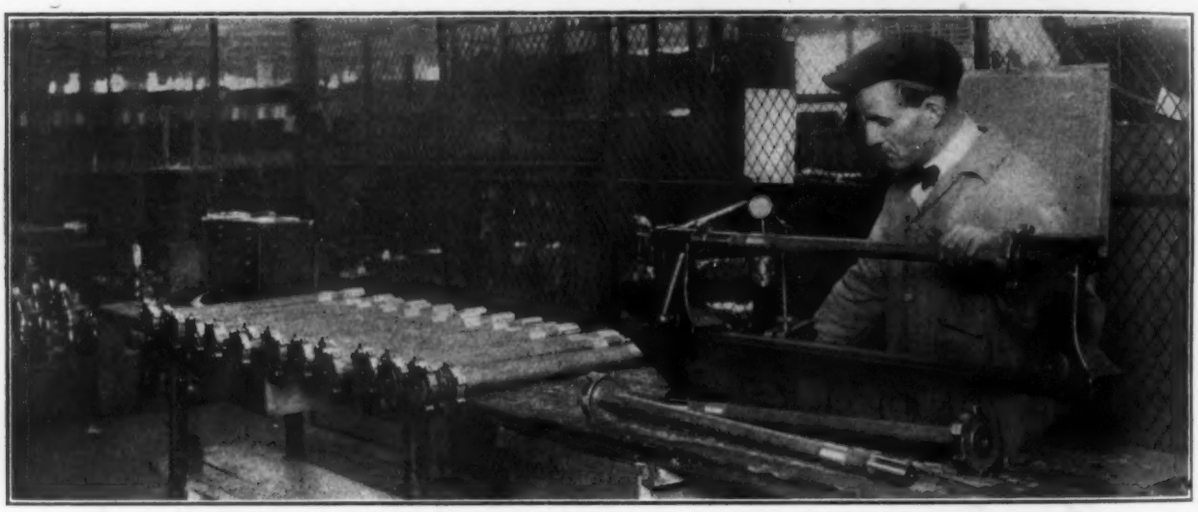
In the machine shop there is an inspection of work at average intervals of 30 minutes. In some cases this may come at longer intervals and in other cases as often as every 15 minutes. This inspection shows whether the work turned out in any operation checks to the specified limits. In case the work approaches either the high or low limits of the specifications in a number of consecutive operations, the jig or fixture is removed and sent to the tool room, where it is checked up with its drawing and repaired if necessary. In designing fixtures simplicity is the aim, a fixture not fully automatic sometimes being regarded as preferable to one that is fully automatic but more intricate.

When final inspection is made, the inspector marks all parts with his individual stamp so that, should a piece not up to the proper limits be passed, responsibility for the error can be properly placed. When an axle is ready to ship it is stamped with a number and a tag signed by the individual inspector is attached. A record is kept of every axle so that, should one be returned or be reported as lacking any part, the responsibility can be placed on the man who made the final inspection.

A daily report is made of the number of parts scrapped. In this report parts rejected are tabulated and the report shows the operation at which the part was rejected, also the department, cause of spoilage and whether the inspection was made after completion. Four copies of this report are made, one going to the factory manager, one to the chief inspector and one to the superintendent, the fourth being for a record file, so that all interested may know the amount of defective work and various details.

Materials purchased finished are inspected the day they are received and, if they do not meet specifications, the manufacturer is immediately informed. By following this plan, the delivery of other parts having similar defects may be avoided and there is less chance for dispute with the manufacturer than where complaint is not made until some time later.

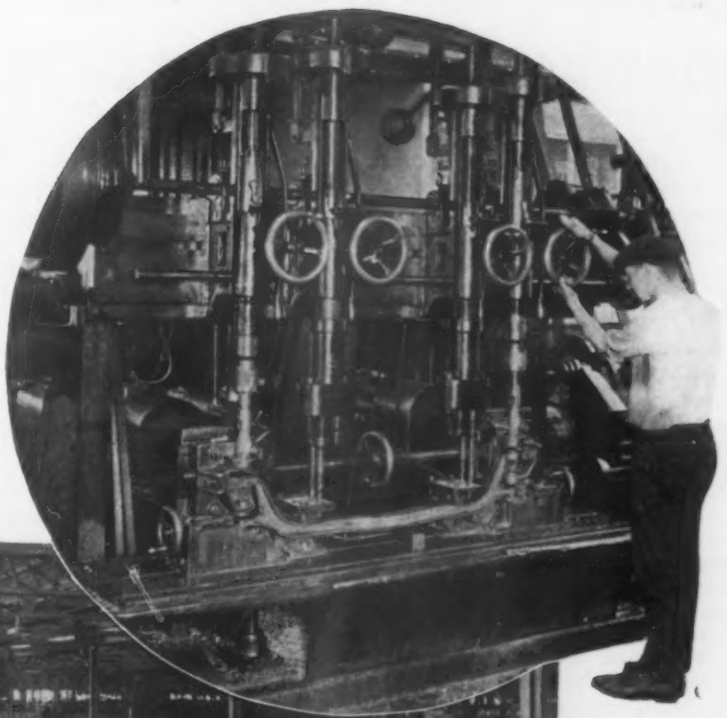
Being probably the latest plant built for the manufacture of automobile axles, the Eaton axle plant is a modern type factory laid out for convenient and economical handling and routing of material. The manufacturing part is a one-story, brick and steel structure of 300 x 450 ft, with sawtooth roof. Across the upper end is a two-track railroad siding which serves both the receiving and shipping departments. Adjoining the receiving department is the rough inspection department with machines for rough grinding, and next to this along one side of the plant is the rough stock storage room. Adjoining this through the center bay is the machine shop, on the other side of which is the inspection department for finished parts and next to this is the finished stock room. This is inclosed with a wire screen so that finished parts cannot get to the stock room before final inspection. Next to the stock room at the outer bay is the final assembly department and at the upper end of the bay the shipping department.



Checking Cadillac Axle Shafts on Bench Center and Indicator, to 0.004 In. Limit

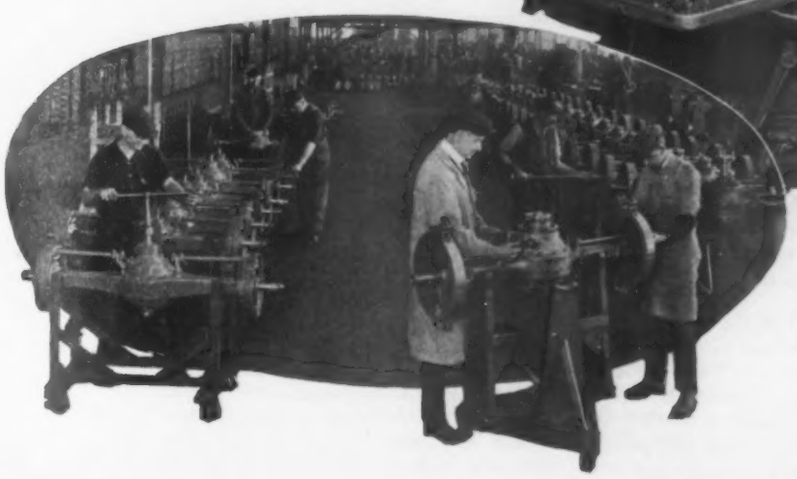
Machine tools in the machine shop are grouped according to operation, each unit complete in itself. Rear axles are machined in the upper end of the plant and front axles and small parts at the lower end. Rough stock passes from the rough stock department directly across to the part of the shop in which it is to be machined and then straight across the stock room to the final assembly department. In the final assembly department the work starts on the rear axle toward the lower end of the shop and moves toward the upper end so that, when the assembly is completed, the axle is close to the shipping department. Generally smaller parts move directly across from the machine shop to the stock room and from there to the

At Right the Machine Is Drilling Spring Seat Holes and King Pin Holes, at One Operation, on a Cadillac I-Beam Front Axle



Below Is Shown the Assembling of Cadillac and Wills Front Axles, the Type of Stand on Which the Axles Are Mounted for Assembly Indicating the Care Taken to Avoid Unnecessary Steps

At Right a Cadillac Rear Housing Is Being Faced on a Machine Designed for This Purpose



At Left Is the Final Assembling Department, Showing Cadillac and Model 1000 Rear Axles Being Assembled on Stands Mounted on Casters

point of assembly. With this arrangement there is virtually no retracing of parts and the amount of handling is reduced to a minimum. The heat treating is done in a separate plant a short distance from the rough stock inspection department.

Handling of parts in process and completed is done largely with elevating platform electric trucks. Special racks on casters are provided for small parts. Danger that parts will become nicked by being thrown on the floor and piled is thus avoided and the use of racks reduces the labor of handling. Work goes through the shop in lots of various sizes. The general policy is to have the machine shop keep 30 days ahead of the assembly department, or carry a month's supply of finished parts in the stock room.

The management keeps a close watch on the proportion of indirect to direct labor. During the readjustment period the drastic steps taken to reduce the overhead cut the office expense over 50 per cent. But no reduction was made in the cost department, as the company wanted to keep this department at a high point of efficiency and with a sufficient force to make quick reports on costs. Practically all employees engaged on production work, except common labor, work on a piece rate basis, involving payment for results produced.

Overheating Aluminum

In a paper read before the Institute of Metals at Swansea on Sept. 21, Dr. Walter Rosenhain and J. W. Grogan described some experiments undertaken to ascertain whether certain forms of treatment in the melting and re-melting of aluminum would bring about in the metal deterioration approximating to the condition generally described as "burnt" aluminum. High grade aluminum was poured at temperatures up to 1000 deg. C. and also at the usual pouring temperature after heating for some hours at 1000 deg. C. The castings so obtained were rolled to sheet form and tested in the annealed state.

No deterioration in the metal could be detected, even when a casting temperature as high as 1000 deg. C. was used. The evidence derived from the tensile tests is tabulated in the paper and has been confirmed by an examination of the small ingots. The appearance of the air surface of these ingots showed no systematic difference corresponding to the increasing casting temperature. The macrostructure was also very similar throughout, except that there was a distinct increase of crystal size with increasing casting temperature.

High-grade aluminum and aluminum containing 0.77 per cent iron and 0.72 per cent silicon were cast to ¾ in. slabs and rolled to a thickness of 0.01 in. This sheet was melted and cast and the whole process repeated ten times. Test pieces cut from sheet 0.05 in. thick from each melt gave figures which indicate no systematic change in the quality of the metal. This is in striking contradiction to the views which have been current in the aluminum industry hitherto.

Dr. C. A. Edwards in the course of the discussion on the paper stated that his own experiments confirmed everything the authors claimed. He thought the difficulties associated with remelting were to a very large extent due to the stirring which was so often too vigorous. If the metal were allowed to stand it was found that not only was the quality better but the amount of dross was less; indeed, he had noticed that on prolonged standing of the molten alloys or pure aluminum the dross was reduced to such an extent that exceedingly little of it was obtained, and its character, so far as it could be judged by ordinary visual examination, was entirely different. The dross, in fact, became like a powder. He considered a high temperature in remelting to be really advantageous because it facilitated the rising and segregation of dross. The chief objection so far as sand castings or chill castings were concerned in connection with the temperature of castings was, he thought, almost entirely due not to any remelting that might have occurred but to the influence of the high temperature of castings upon the slower rate of cooling. He asked the authors if they had evolved any method for satisfactorily estimating oxygen in aluminum.

Dr. A. C. C. Gwyer considered that the authors had proved their point and he said it would be interesting when the work had progressed farther to know exactly what the contamination was due to. Under ordinary circumstances, he said, repeated re-melting caused deterioration in rolling qualities, and it was difficult to see what that was due to owing to the fact that aluminum was such an extraordinarily difficult metal to analyze. His own experience led him to believe that the oxygen content of aluminum must be very small. With regard to casting, he did not consider heating to a high temperature prior to casting to be necessarily bad; it depended entirely upon the rate at which the casting cooled. He knew of cases in which very thin sections for body work had had to be cast in aluminum in this country and in America, and no difficulty at all had been experienced.

Nature of the Dross

J. D. Grogan, who replied to the discussion, said that the author's experience in regard to dross was that in re-melting the sheet the dross was very "metallic" and silvery, and contained a large amount of free metallic aluminum merely entangled, presumably in a mesh of oxide. In the case, however, of the metal deliberately overheated the dross was very hard and sometimes black, although it was not carbon. It was in the form of very fine lamellæ parallel with the surface, and it could be torn apart and divided into sheets. Some of the material when assayed contained apparently over 99 per cent of aluminum. With regard to the question of the determination of oxygen, a large number of methods had been tried without success.

Combustibility of Coke in the Blast Furnace

Further work on the combustibility of coke and relative reactivity with carbon dioxide is being conducted by the Southern experiment station of the U. S. Bureau of Mines, Birmingham-Tuscaloosa, Ala., in cooperation with the Pittsburgh station of the bureau. Two variable properties of coke, its combustibility and rate of oxidation or "solution" in carbon dioxide, are believed to play an important part in its performance in the blast furnace. It has been stated that the ideal coke should come down to the tuyere zone without oxidation by the carbon dioxide in the stack gases (Gruner's ideal working) and should there burn rapidly carbon monoxide. Laboratory scale tests for determining relative combustibility of cokes and their reactivity with carbon dioxide have been developed and a number of by-product and beehive cokes tested. The relation between these values and the physical properties of the coke has been studied. A comparison of laboratory scale test results and results of actual furnace practice is being made.

Study of Electric Furnace Refractories

As it is hoped to develop refractories for electric furnaces, it is desirable to have a method and apparatus for measuring their conductivity at advanced temperatures, states the Federal Bureau of Mines. Moreover, data in regard to the conductivity of existing refractories at temperatures above 1400 deg. C. are meager. It is proposed by the bureau to study the leakage factor through refractories. The method of attack has been worked out and the furnace designed, the material for which is arriving at the bureau's ceramic experiment station at Columbus, Ohio.

New Development in Cupola Construction

The Schuermann Equipment in Germany Involves Pre-Heating the Blast and Shortening the Time of Melting

A NEW development in cupola construction is presented by the Schuermann cupola which is described in the issue of *Die Giesserei*, No. 18 for 1922. The author of the article is E. Hellmund, operating manager of the Werner Iron & Steel Co., Duelken, Germany, where working tests were carried out. The inventor was formerly owner of a foundry at Coswig, and has protected his cupola by German Patent No. 266303. The objects desired are a shortening of the time during which the melting iron is in contact with the glowing coke and more especially the ascending column of gases, and also a preheating of the blast. When first introduced to foundrymen the proposed new cupola attracted very little interest, but it was decided to make a practical test at the Werner plant.

Fig. 1 shows a typical diagram of a Schuermann cupola. The blast enters through the reversing valve a, passes through chamber b of the pre-heater, enters the cupola at c and enters into combustion with the coke. The waste gases pass through the chamber e thereby heating it, then through the reversing valve a and the throttle valve f to the chimney g. As well as through the openings square across the cupola, a part of the blast is at the same time carried through two tuyeres arranged at the sides so as to cover the total space.

As the result of tests which have been carried far enough to be considered conclusive, the amount of coke needed is from 6.5 to 7.5 per cent, depending on the kind of castings to be made. In most cases the iron had to be strongly over-heated for their thin-walled castings, but even then they never used more than 7.5 per cent coke. For the first 15 charges they used 7 per cent and for the following 15 charges 7.50 per cent. They work 48 hours per week, only 5 days in the week; following this the chambers for heating the blast remain cold Saturday and Sunday with no auxiliary fire, only the throttle valve remains always closed. Even then when starting up Monday morning it is not necessary to use for the first charges more than 7 per cent coke. The monthly coke consumption with normal cupola operation used would be as follows:

15 tons × 20 = 300 tons charge with 10.6 per cent coke. This = 31.8 tons. To-day 300 tons × 7.25 per cent = 21.5 tons, showing a saving of 10 tons in the month.

This amounts to 120 tons per year which, with the present price of coke, including freight, cost of unloading, etc., equals a very large amount per year. In addition to the saving of coke the quality is improved due to the lowering of the sulphur by 20 to 30 per cent.

Figs. 2 and 3 show the automatic records of amount and pressure of blast. As may be clearly seen reversals were carried out every 10 min. During the period a reversals were at 3-min. periods in order to burn the coke bed and also heat the two chambers. The period b shows the time of the first charge, while c shows the normal running. In period d the blast was taken off while the slag tap was closed. The final period e shows the blast entering from both sides. The temperature of the waste gases leaving the chimney stack was about 100 to 150 deg. C., which is a proof that the brick work of the chambers was absorbing the greatest part of the heat. The melting ran along without trouble and the reversals prevented a slagging of the tuyeres.

It is hoped to decrease, even more than at present, the amount of blast passing upward through the column of charge, which it is believed will still further reduce the coke consumption, because the carbon of the coke

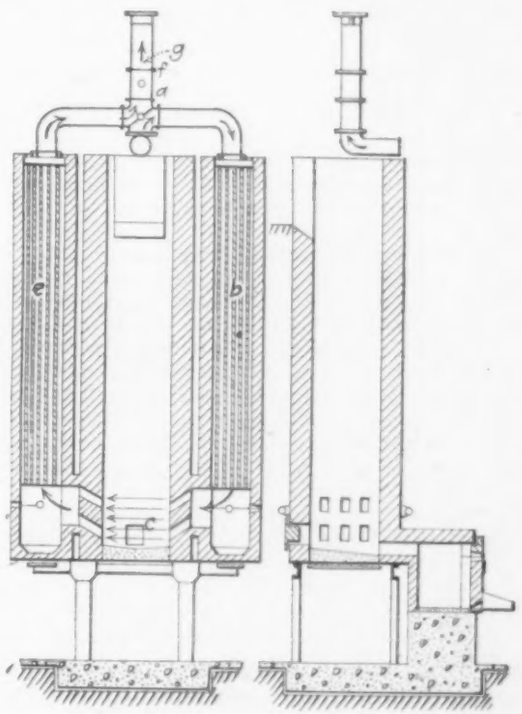


Fig. 1.—Typical Diagram of the German Schuermann Cupola

will not be acted on by the carbon dioxide. Shortly after starting, the gases pass from the heating chamber to the cupola at about 400 deg. C. After two or three reversals the blast temperature reaches about 800 to 900 deg. C.

In order to use the carbon monoxide present in the waste gases, a small amount of blast is introduced in the heating chambers. The results show that for about

Table of Test Results of Cupola Operation with Hot Blast

Coke Charge, Per Cent	Coke Bed, Lb.	Blast: Pressure, in Oz.	Blast: Amount Cu. Ft. Per Min.	Blast: Deg. C.*	Waste Gas, Deg. C.	Run: Begun	Run: Ended	Charge in Lb.	Sulphur, Per Cent: 1	Sulphur, Per Cent: 2	Sulphur, Per Cent: 3
8.0	1,650	7.5 to 10.0	2,650 to 3,000	400 to 900	100 to 150	3:20	6:30	23,150	....	0.101	0.089
7.0	1,650	8.6 to 11.2	2,650 to 2,900	400 to 900	100 to 150	3:10	6:10	20,390	0.112	0.11	0.075
6.5	1,650	8.0 to 10.8	2,540 to 2,900	400 to 900	Charge 15 had 7 per cent coke	2:50	6:10	22,600	0.120	0.111	0.086
6.5	1,650	8.2 to 10.0	2,650 to 3,000	400 to 900	15,430 lb. cold iron	2:55	6:25	25,350	0.110	0.112	0.080
7.0	1,650	8.6 to 11.2	2,650 to 3,180	400 to 900	.....	2:40	6:00	24,800	0.135	0.14	0.112
6.5	1,650	10.5 to 11.5	2,650 to 3,000	400 to 900	Charge 14 had 7 per cent coke	3:10	6:00	18,200	0.156	....	0.079
6.5	1,650	10.0 to 11.5	2,820 to 3,000	400 to 900	Charge 15 had 7 per cent coke	2:38	6:20	25,900	0.130	0.104	0.083
6.5	1,650	10.0 to 11.5	2,820 to 3,040	400 to 900	.....	3:10	5:55	21,500	0.136	0.076	0.062
6.5	1,650	10.8 to 11.2	2,970 to 3,040	400 to 900	.....	2:55	5:55	25,350	0.134	0.083	0.055
6.5	1,650	10.5 to 10.8	3,000 to 3,180	400 to 900	33 min. stoppage of current	2:50	6:15	25,350	....	....	....

*750 to 1650 deg. Fahr.

3 months the highly heated iron necessary for thin castings has been produced without trouble or other bad effects and with, at the most, a coke charge of 7.5 per cent. At the same time the sulphur of the iron has shown a reduction up to 30 per cent, which results lead to the conclusion that a remarkable improvement has been reached in the cupola melting practice. The writer of the German article believes no such fundamental change in cupola practice has been seen for the last century.

In the table are given the results of a two weeks' test which began with a coke charge of 8 per cent, a coke bed of 1650 lb. with a blast pressure of 7.5 to 10 oz. Higher pressure was not possible with the blow-

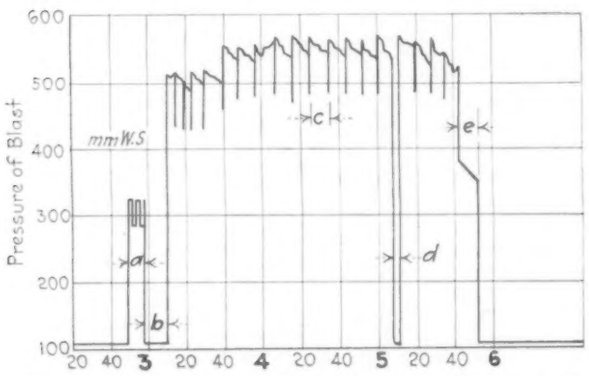


Fig. 2.—Automatic Record of Amount and Pressure of Blast in New German Cupola

ing arrangement available. The amount of blast amounted to 2650 to 3000 cu. ft. per min. The entering blast was from 400 to 900 deg. C., the waste gas temperature 100 to 150 deg. C., the charge 10.5 metric tons. The blast was begun at 3:20 and ended at 6:30, so that the rate of melting was about 3.4 tons per hr. The rate of melting in this case was too small and could not be much increased during the two test weeks. This was because the side tuyeres, mentioned above, were arranged in the brick work of the cupola and could not be changed during this period.

The sulphur content of the molten iron showed, during 5 days with 7 per cent coke, a decrease from 0.14 to 0.11 per cent, which equals about 20 per cent. During the whole test period, with the exception of 4 days when they had 1540 lb. of cold iron which could not be cast, they had uniformly over-heated iron which gave good castings. During the test period they got down to 6.5 per cent coke, and even during the last day had no trouble from cold iron, notwithstanding a 33-min. delay from stoppage of current.

In the table the various sulphur results are shown and on the average the decrease amounts to 20 to 30 per cent. It also must be remembered that they melted with a shaft furnace. In a furnace with a fore-hearth the final sulphur would have been still smaller.

The test period showed the changes necessary to be made. To-day they have a rate of melting of 5¼ tons per hr. and are in the position to possibly increase this through increasing the size of the side tuyeres, but this is not desirable for their practice as they would not be able to cast the extra metal so provided. No disadvantages of the new method of melting have been found up to the present time. The heating chambers are clean and show no effects of the heat, which will probably be seen after a year in operation. It is assumed that the life of these chambers will be at least 5 years. It is also assumed that, with normal working, the cost of the plant for a daily output of 15 tons will be covered by the saving in coke in one year's operation.

This paper was read at a meeting of the German Foundrymen's Association on April 27, at Duesseldorf, and was followed by an active and interesting discussion. The presiding officer, Doctor Werner, said that the new cupola had been brought to the attention of the German Foundrymen's Association during the war but nobody was interested in it, and the inventor made the proposal that the cupola would be available to all the German foundrymen without license, except for covering the heavy costs already incurred for home and foreign patents. Doctor Werner, after investigation, made up his mind to try the cupola in their plant at Duelken, and the paper abstracted above gives the results obtained. It is certain that the final construction of the cupola has not been reached but, as built for the test run, has shown splendid results. The Schuermann company has designed a new construction.

During the discussion one question asked was whether the heating chambers did not need frequent cleaning. The reply was that during the three months' operation this had not been found necessary. In reply to another question it was stated that the cupola had a diameter of 35.4 to 39.4 in. Another speaker pointed out that spark arresters would not be necessary and the three months' operation had shown no danger of explosions. Uncompleted tests showed that the gases leaving the combustion chamber have about 5 per cent CO with 13 to 14 per cent CO_2. Mention was made of the danger of explosions, but it was believed that with suitable doors to guard against explosions this could be avoided.

The heating chambers are constructed of fire brick exactly the same as for the stoves of a blast furnace. Also after each day's run the cupola lining is fixed up, and after the three months' run a complete new lining was put in. Another speaker mentioned he had carefully followed the operations in Duelken and could corroborate the results obtained. One point he wished to make was that with the small amount of coke, only 35 kg., for a charge of 500 kg. very uniform distribution must be used. The dust that collects in the brick work of the heating chambers is easily removed by means of compressed air. He believed this style of cupola would be especially suitable for small Bessemer plants because no sulphur was taken up from the coke

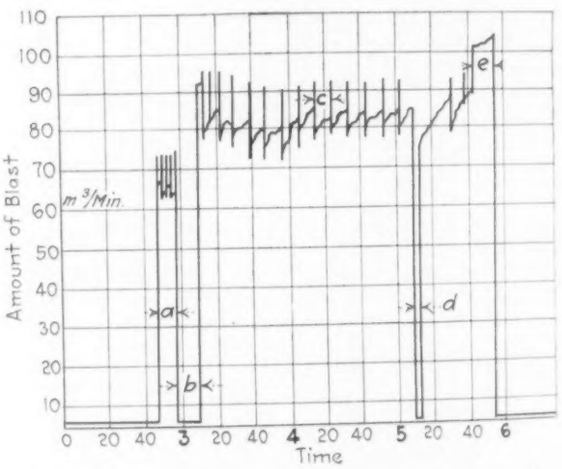


Fig. 3.—Automatic Record of Pressure and Amount of Blast in Schuermann Cupola

and probably large amounts of scrap could be melted. In reply to another question it was stated that the average charge consisted of 50 per cent pig iron and 50 per cent scrap iron castings.—G. B. W.

The importation of scrap from Russia into Germany is on the increase. From July 15 to Aug. 15, over 17,700 tons were sent from Petrograd, including a steamer for breaking up. A further 8000 tons and two old warships are about to be sent. It is expected that the export program of Metallotorg, the company formed to expedite trade between Germany and Russia, which provides for the export of 75,000 tons for the year, will be fully executed.

At the October meeting of the Washington chapter of the American Society for Steel Treating on the evening of Oct. 20, W. J. Newton, research engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will discuss "The Heat Treatment of Helical Springs."

Gear Makers Hold Notable Meeting

Advanced Recommendations on the Case Hardening of Gears—Gear Noise Elimination Seriously Considered—Buying Gear Blanks by Piece

THE Chicago convention of the American Gear Manufacturers Association was replete with papers, reports and discussion. They bore witness to the unusually active interest of members in the efforts of the society to solve the problems of the industry. Standardization occupied much of the time of the sessions and the progress made by the various committees assigned to this work was encouraging. The measurement of gear noises was the subject of two addresses and caused considerable discussion, with the likelihood that the society will finance some experimental work to that end. The problem of apprenticeship received serious consideration and a revolutionary change in purchasing policy was urged in a paper recounting the experience of a company which now buys gear blanks by the piece instead of by the pound. Wide variations in costs, disclosed by a questionnaire sent to the membership, were cited as indicative of the urgency of uniform accounting methods.

The meeting was held at the Drake Hotel, Chicago, Oct. 9 to 11, inclusive. President F. W. Sinram was in the chair and T. W. Owen was elected secretary to succeed F. D. Hamlin. Mr. Owen will devote his entire time to his duties and has been provided with an office at Cleveland. There were 80 in attendance at the convention, most of them executives of the member companies. Three new companies were admitted to membership and three additional associate members were elected.

Notable Progress in Standardization

The report of the A. G. M. A. sectional committee of the American Engineering Standards Committee, B. F. Waterman, Brown & Sharpe Mfg. Co., chairman, indicated what progress was being made in the adoption of standards affecting the gear industry. Standards for gears and pinions for electric railroad service, gray iron industrial gears, specifications for forged and rolled steel for gears, and specifications for brass and bronze for gears were passed for printing by the committee last spring and will now be submitted to the sponsor societies for their approval as tentative American standards, following which they will be passed on to the main committee. At the last meeting of the sectional committee it was voted to submit for printing the A. G. M. A. standard for composite gearing, its recommended practice for the inspection of gears, its recommended practice for herringbone gears, and its recommended practice for industrial spur gears.

The general standardization committee, B. F. Waterman, chairman, reported the adoption of recommended practice for the adjustment of bevel gears at assembly and a recommendation for backlash in bevel gears, both of which have been printed. These have not yet been submitted to the sectional committee, however, as the sub-committee on bevel gears hopes to have more complete data to offer later. The sub-committee on herringbone gears has reconsidered the recommendations of the sectional committee and adopted them. The only item in the committee's recommendation still unsettled is that on the strength of herringbone gears, but the sectional committee has agreed to the formula offered by the sub-committee for speeds up to 2000 ft. per min., and on this basis will submit the entire recommendation for printing as a proposed standard.

The recommended practice for the inspection of gears, as revised by the sectional committee, has been adopted and submitted to the committee on plain limit gages of the American Society of Mechanical Engineers and as it does not conflict with any tentative procedure of that committee, has been passed for printing in the journal of the A. S. M. E. and has likewise been printed by the A. G. M. A.

The keyway committee made a tentative report at the last convention but has taken no further action, as it is now working with the committee of the A. S. M. E.

The differential committee has been in close touch with the Society of Automotive Engineers since sending out a questionnaire on which its progress report on proposed differential nomenclature was made at the last convention, and will soon have a differential nomenclature acceptable to most anyone.

The tooth form committee has under way an experiment to determine the possibility of a stub-tooth proportion which might enable the present proportions now in general use to be used with it, at the same time obtaining the advantage of a longer tooth which so many think desirable. Stub-tooth proportions are also being studied by foreign engineering bodies, notably Dutch and French.

Later in the meeting H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., speaking for the tooth form committee, of which he is chairman, stated that much of the time of the body has been taken up in defining accurately the technical terms used in connection with tooth forms, a task which is rendered difficult by the wide variation in usage. He said the committee is not yet ready to recommend any one tooth form as standard. It is likely, however, that a standard stub-tooth form will soon be recommended, as preliminary tests have proved satisfactory. So far the only feature agreed upon is a 20-deg. pressure angle.

New Standard Bevel Gear Adopted

Of all of the sub-committee reports those on metallurgy and straight and spiral bevel gears commanded the most attention. F. E. McMullen, the Gleason Works, Rochester, N. Y., chairman of the bevel and spiral bevel gear committee, offered for adoption as a standard the system of bevel gear design described in a paper read at the last meeting of the society. In the past spur gear formulas have been used in figuring bevel gears, but as these formulas were worked out for an interchangeable spur gear system which necessarily required some compromise, the possibilities of the involute curve were not so fully utilized as it is felt desirable in bevel gears where interchangeability is not a factor.

The basis of the bevel gear system recommended by the committee is the use of the lowest pressure angle that can be employed without sacrificing strength by introducing excessive under-cut. Experience shows, it is asserted, that bevel gears cut with a lower pressure angle will operate more quietly than those with a higher one, other conditions being equal. The system, which is to apply to generated gears only, provides only three pressure angles (14½, 17½ and 20 deg.) for straight-tooth gears in all ratios having ten or more teeth in the pinion. The 17½-deg. angle need be used for only about 6 per cent of the total number of ratios, but it is considered necessary to carry out the purpose of developing a practical system which will give the quietest form of tooth consistent with strength and wear. For spiral bevel gears one pressure angle, 14½ deg., suffices for all except a few unusual cases, for which a 17½ deg. angle is used. Under the system the gear addendum decreases and the pinion addendum increases as the ratios of the numbers of teeth in the gear and pinion become greater. The report was adopted as a suggested standard for future design of bevel gears. C. B. Hamilton, Jr., Hamilton Gear & Machine Co., Toronto, Ont., recommended that all gears made ac-

cording to this system be stamped with some identification mark, such as a star. This would facilitate the replacement of broken gears in the future because it would indicate to the gear maker that he could duplicate the gears desired by following this standard.

The committee also presented formulas and descriptive terms for calculating the axial thrust loads of spiral bevel gears, which were adopted as recommended practice.

Time Factor in Case Hardening Emphasized

The metallurgical committee, C. B. Hamilton, Jr., chairman, presented a voluminous report covering recommended practice for carburizing and case hardening, and recommended practice for the heat treatment of A. G. M. A. carbon and alloy steels, the latter being covered by graphs. In its instructions covering the selection, test and use of carburizing materials, the committee states that the idea that fast penetration is a mark of merit is a fallacy. Fast penetration is a desirable feature from a cost standpoint, but it is, almost without exception, accompanied by an excessive high carbon surface and its product, free cementite. In order to put the free cementite into solution, the saving made in the time of the carburizing operation is usually lost by the first or high heat of double heat treatment. While the fact does not appear in any publication that steel of a specific analysis has a certain rate for a certain intensity of carbon absorption, there are evidences that lead one to believe that this condition exists. In other words, a certain steel will absorb an eutectic case of a certain depth in a certain length of time, and nothing will decrease this time, without causing the case to become hypereutectic.

The major part of the report dealing with recommended practice for carburizing and case hardening is devoted to detailed instructions as to the selection of carburizing materials, the design and use of carburizing pots, local carburizing, local heating, local quenching, the prevention of adherent scale, and the selection of quenching mediums.

Term Semi-Steel Not Approved

These recommended practices were adopted as a report of the committee, their final adoption by the society being deferred until the next convention to give the membership time to give them careful study. The indorsement of the association was given to the term "high test gray-iron castings" in place of the misnomer "semi-steel," as suggested by the American Society for Testing Materials which is now working out a specification for it.

In outlining the work which will be undertaken by the committee in the future, Mr. Hamilton said that hardness testing and inspection would be the subject of the report for the spring meeting and that a model metallurgical laboratory for the average medium-size gear shop would be exhibited. This laboratory will be equipped largely for the control of materials purchased, he asserted. For the meeting next fall the committee proposes to take up the subjects of furnaces, pyrometry and micrography. Mr. Hamilton was enthusiastic in his expressions regarding the possibilities in the improvement of gears through metallurgical research. He hinted that it might some day prove worth while for the association to employ a consulting metallurgical engineer. He deplored the fact that the committee had not received greater co-operation from the membership and pointed out the excellent results achieved by the American Malleable Castings Association through the centralizing of information regarding the industry and the pooling of metallurgical difficulties.

Inspection, Nomenclature and Other Reports

The inspection committee, F. G. Eppley, Albaugh-Dover Co., Chicago, chairman, presented a report covering methods of inspecting gears, the use of testing machines, etc. The methods outlined were adopted as recommended practice except for a single section relating to hardness tests.

A progress report of the sprocket committee, C. R. Weiss, Link-Belt Co., chairman, indicated that certain minor changes in tooth form would probably be made, and when a formula has been agreed upon by the conferring sub-committees, it will be reported to the various sponsor societies. The changes, however, will not interfere with the use of standard hobs.

Speaking for the differential committee, the chairman, S. O. White, Warner Gear Co., Muncie, Ind., stated that a nomenclature had been worked out in conjunction with the appropriate committee of the Society of Automotive Engineers. It was found necessary to divide differentials into two classes in order to come to an agreement on nomenclature, as the use of the same terms differs widely. Thus far actual standardization of differentials has been attempted on two sizes only. This latter work is still in the formative stage and the committee is not ready to make any recommendations.

The nomenclature committee, F. E. Eberhardt, Newark Gear Cutting Machine Co., chairman, reported that it was gathering nomenclature and symbols in collaboration with the other sub-committees and that it found that there was considerable latitude in the use of terms applying to gears. Through the sectional committee of the American Engineering Standards Committee it is also becoming familiar with nomenclature used abroad. The committee is tabulating this information to make it available for the use of the society.

Problems in Measuring Gear Noise

One feature of the convention which commanded especial interest was an address on the "Standardization of Gear Sounds" by Prof. Daniel L. Rich, dean of the Department of Physics, University of Michigan. He named three methods employed to control sound: (1) Permit the noise and try to absorb it; (2) try to insulate noise and thereby confine it within certain limits; (3) prevent the starting of the noise in the first place. All good architects are familiar with methods of absorbing noise. An audience is probably the best absorbent; other means used are felt on the walls and carpets on the floors.

The successful insulation of noise is a problem as yet unsolved. As applied to gears, sound absorbents have met with slight success. The confinement of the gears in a box serves as a fair insulation when the sound vibrations are slow, but otherwise the box is of little service. The common metals are excellent sound conductors and the frame supporting the gear box acts as a resonator, often deceiving the listener as to the real source of the noise. Hence the third method, *i. e.*, preventing the generation of the noise, is the only feasible one as applied to gears.

Thus far the only way in which gears have been inspected for noise has been by ear. In other words, the matter has been left to the arbitrary judgment of the inspector, a very uncertain and variable factor. There has been no quantitative physical measurement of sounds. Sound indicators thus far devised are usually resonators responding only to one pitch. Obviously they would be of little service in measuring the noise emanating from gears. An indicator for this purpose would have to be non-selective. Perhaps the best indicator of this type is the pressure vane which responds to the air pressure set up by the noise vibrations. This, or possibly some other indicator, might be used to measure gear noises.

The measurement of noises is not so difficult as the interpretation of the measurements. Surroundings have much to do with sounds. In a room, sounds are reflected from wall to wall, from wall to floor, from wall to ceiling, etc., with the consequence that results gotten with an indicator in one room would be different than those which would obtain in another room or out in the open. Objects within a room also serve to reflect the sound vibrations. It is obvious that the room must be bare and likewise the gears must be stripped, for if this were not done it would be impossible to tell whether the gear sounds were attributable to the gears, to the shaft in its bearings, to the gear box or to the supporting frame work.

It is impossible to measure the output of noise in

absolute units; *i. e.*, an increase of 10 per cent in the inclination of an indicator does not mean a 10 per cent increase in noise. It is possible, however, to make relative measurements; *i. e.*, to ascertain whether one gear is noisier than another, and from a commercial standpoint, relative values are often all that is desired. All gears compared, however, must be tested under identical conditions. The measurement will involve not only the use of a machine but a calibrated room. Hence the sound meter will not be portable.

Prof. A. E. White, director department of engineering research, University of Michigan, explained that for the sum of $3,500 to cover only the direct labor and materials required, he was sure that his department could provide equipment to calibrate the noises from simple pairs of gears. Of this amount $1,200 would cover the personal services of Professor Rich over a period of a year; $800, the service of his assistants, and $1,500 the proper sound proof room and apparatus. For an additional sum of $3,500 to be expended also over a period of a year he believed that equipment could be provided to calibrate noises from trains of gears. The proposal brought forth favorable comment and was taken under advisement by the executive committee.

Buying Gear Blanks by Piece, Not By Pound

An old practice of the gear industry was challenged in an address by L. G. Hewins, sales manager Van Dorn & Dutton Co., Cleveland, entitled "Why Buy a Pig in a Poke?" Customers, he pointed out, demand a piece price per gear and his company believes it only right it should buy gear blanks on the same basis. By adopting this policy, it not only took guess-work out of material costs, but has been able, in some cases, actually to save as much as 25 per cent. The plan is especially applicable when castings or hand forgings are used in quantity. Under the old plan, the company had to pay so much a pound, and for the most part let the other fellow decide how much extra the castings should weigh.

Now the incentive of the foundry or forge shop is to work to size. To illustrate, a certain size of forgings bought in lots of 50 formerly averaged 100 lb. each. Under the piece price plan the average weight dropped to 85 lb., actually reducing the cost per piece to $3.40 as against $4 before. A saving of 40c. was also made in turning time, in addition to the saving in preheating costs. It sometimes requires a little more time to predetermine the piece prices, but it gives the company an extra check on its own estimated material costs. A distinct advantage is that it reduces guess-work in figuring on business because it enables one to determine in advance just what each piece will cost him. Some difficulty was encountered at first in inducing foundries and forge shops to quote per piece instead of per pound, but now all work is bought in this manner except malleable castings, and the malleable shops are expected to agree to do so likewise. To assist the shop in quoting, detail prints are supplied and it is permitted to inspect the pattern equipment or to quote on it, if it has not yet been made up.

Question of Costs

The uniform cost accounting committee, J. H. Dunn, R. D. Nuttall Co., Pittsburgh, chairman, reported a small response to questionnaires sent out to the membership. If this be due to fear lest the law be violated, he said that members should disabuse their minds, as the questions asked did not have anything to do with the comparing or fixing of prices, but related solely to costs. Such replies as were received, he stated, showed wide variations in estimated costs. For several designs of industrial gears, a difference of 50 per cent was common and the extreme differences ran up to 100 and 150 per cent. There was nothing uniform about the estimated weights, the time consumed on the same machine in different shops, the material costs, the labor charge, or the overhead. There is a very evident need for a standardization of methods, as well as for uniform cost accounting.

The subject of costs was also touched upon in the report of the commercial standardization committee, E. A. Kebler, Fawcus Machine Co., Pittsburgh, chairman. The importance of a good cost system can be overlooked by no gear manufacturers, whether large or small. A company with a million and a half dollars capital pushed a line, thinking it was its most profitable output, but abandoned it entirely when a proper cost system disclosed the fact that this production for years had been sold at much less than cost. Frequently, small machines bear a greater burden than larger equipment. The committee stated that the scope of its work was limited, as certain commercial practices cannot legally be standardized. A uniform contract form, however, is fully within the law, and is worthy of general adoption.

Variations in Labor Wage Rates

The marked variations in costs were brought out in bold relief by the industrial relations committee report, which was read by the chairman, J. B. Foote, president and treasurer, Foote Brothers Gear & Machine Co., Chicago, who died suddenly the day after the close of the convention. The report, which summarized replies from a questionnaire sent to the membership, disclosed a great variance in the wages of men on the same work in different cities. The wages for boring machine hands ranged all the way from 40 to 80 cents an hour. Other wages varied as follows: lathe hands, 40 to 73 cents; planer hands, 40 to 72 cents an hour; gear cutter hands, 40 to 70 cents an hour.

Mr. Foote's report also devoted considerable attention to the subject of apprenticeship. It pointed out that there is an acute shortage of general all-around mechanics because young men to-day are assigned to specialized tasks, and shops are either too busy to train new men or have given up teaching apprentices for the reason that once they are trained or partly trained they leave for other shops that offer slightly higher wages. A real need for a practicable system of training apprentices exists, however, and coöperation between shops in support of this training was suggested. Similar coöperation to prevent apprentices from jumping their contracts was also emphasized as a necessary part of the plan.

Apprenticeship was discussed even more fully in an address by P. C. Molter, superintendent of the department of industrial education, National Metal Trades Association. Mr. Molter enumerated various plans for training apprentices, among them, training within an individual plant or the pooling of supervision and instruction by a group of employers; training in trade preparatory, trade continuation and trade training schools, supported by federal, state and local funds; and the coöperative plan whereby apprentices alternate in attending schools and in working in shops. Mr. Molter also outlined the plan which has been worked out by his association, under which a curriculum has been provided, rates of pay have been fixed, periodical examinations will be held and certificates will be issued. In fixing the rates of pay the aim has been to discourage the jumping of apprenticeship contracts. In the first year the apprentice receives 33⅓ per cent of the journeymen's wages. The percentage is steadily increased until the last year when a wage of 85 per cent of that of the journeyman is paid. The aim of the certificate is to provide a means of identifying boys who have completed their training and to prevent those who have broken their contracts from obtaining employment as journeymen.

There was considerable discussion of the subject by various members of the society and the consensus of opinion was that there was no way of holding apprentices to their contracts except through moral suasion. A certain number of boys are bound to leave before the completion of their training, and likewise those who do finish may desert the shop of their employer for other plants. E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., was enthusiastic in his praise of the co-operative plan in force in his city, and pointed out that while apprentices often left for employment in other shops, they frequently came back. George L. Markland, Jr., Philadelphia Gear Works, Philadelphia, added that they not only returned, but

they came back better men because of the broader point of view developed through learning the practices of other shops.

Mr. Molter mentioned two means of holding apprentices until the completion of their training which have been employed successfully by a number of manufacturers. One method is to supply the apprentice with tools as he progresses with his work so that by the time he completes his course he is in the possession of a complete kit. The other is to give the apprentice a bonus when he finishes his training.

Conditions Under New Tariff

S. L. Nicholson, Westinghouse Electric & Mfg. Co., reported for the tariff committee, of which he is chairman. He stated that the new tariff does not affect gear makers directly but gives them a protection of 40 per cent ad valorem under the catch-all clause of the metals section. He thought the ad valorem method would prove satisfactory, particularly because of the flexible feature of the act which permits duties to be lowered or raised on investigation. The tariff is not a high one compared with its predecessors. The Dingley act yielded 25.54 per cent on the import value; the Payne-Aldrich law, 19.34 per cent; the Underwood, 8.3 per cent; and the present tariff, 15.70 per cent. Mr. Nicholson does not believe that the tariff will raise the cost of living. The greatest factor for higher living costs in his opinion lies in our restrictions on immigration which, in effect, constitute a tariff on labor.

A paper by George L. Markland, Jr., on the "Evolution of the Gear," traced the earliest known toothed wheel to 300 B. C. when a metal pinion engaging a metal rack was used to operate a water clock in Egypt. In the middle ages Leonardo da Vinci, the great Italian, 1452-1519, wrote a number of learned treatises on gear teeth. Camus, a Frenchman, 1699-1768, wrote on the teeth of wheels about 1738, showing an excellent grasp of the epicycloidal tooth form. In the English translation published in 1868, the editor, John Isaac Hawkins, predicts that the involute curve will supersede the epicycloidal.

The report of the public policy committee was read by the chairman, H. E. Eberhardt, Newark Gear Cutting Machine Co. Herein was indicated the wide connections of the society in its standardization work. Its coöperative activity brings it into contact with the Society of Automotive Engineers, the United States Bureau of Standards, the American Society of Mechanical Engineers, the American Engineering Standards Committee through the A. G. M. A. sectional committee on the standardization of gears, the British, French, Swiss and German Standards Associations, and the Association in the Netherlands for the Establishment of Standards.

The banquet was addressed by Judge Marcus J. Kavanaugh of the Cook County Superior Court, and Col. John V. Clinnin, also of Chicago. John B. Foote was toastmaster.

The next annual meeting of the association will be held at Cleveland the last Thursday, Friday and Saturday of next April.

MINING CONGRESS MEETS

Many Problems Considered at Cleveland—Carmi A. Thompson Speaks on Iron Ore Industry

Various problems, including taxation, legislation and industrial relations, were discussed at the twenty-fifth annual meeting of the American Mining Congress held in Cleveland, Oct. 9-14. During the closing session the congress adopted a resolution favoring legislation that would prevent strikes. The resolution declared that strikes or lock-outs in essential industries should be impossible, and that laws should be made and enforced by all the power of the Government that could forever strip labor organizations, as well as employers, of the ability to interfere with the production and distribution of the necessities of life.

Another resolution provided for the continuation of the committee on industrial co-operation which was organized at a previous session, and asks that both employees and mine operators be urged to unite in a general movement which would have for its ultimate accomplishment harmonious relations, continuous employment, fair wages and reasonable profits, and the cheapest priced commodities to the consumers, which these conditions will permit.

Another resolution attributed to the restriction of immigration in considerable part the shortage of labor in the metal mines, and authorized a committee to make a study of this matter.

Among the speakers was Carmi A. Thompson, vice-president Tod-Stambaugh Co., Cleveland, Republican candidate for governor of Ohio, who discussed "Some Requirements of the Iron Ore Industry." He declared that iron ore has never enjoyed its fair share of any prosperity that comes to the iron and steel industry from time to time, and referred to the tremendous burden of taxation that the iron ore industry has to bear. He called the iron mining industry a liquidating business for the reason that as soon as a mining company begins to ship ore, it begins to liquidate its assets. He said that the occupational tax imposed on iron ore in Minnesota last year amounts to a tax of 10c. to 12c. per ton on ore.

Mr. Thompson declared that unless relief is found either in the way of higher priced ore, or from some of the tax burden, the underground iron mines cannot longer be operated, and that the great reservoir of cheap ore from the open pit mines will be practically exhausted within the next 10 or 12 years, and then the country would be dependent upon underground ore. That fact would assure a higher price for that commodity.

Among other speakers were W. A. Grieves, Jeffrey Mfg. Co., Columbus, Ohio, chairman of the industrial co-operation division, who spoke on "Industrial Co-operation from a Practical Viewpoint," and Arthur Young, vice-president International Harvester Co., Chicago, who discussed "Some Practical Experiments in Industrial Co-operation."

Richard F. Grant of M. A. Hanna & Co., Cleveland, was toastmaster at the silver anniversary banquet Friday evening.

Sidney J. Jennings, vice-president United States Smelting & Refining Co., New York, was elected president. The directors include William H. Lindsey, vice-president Napier Iron Works, Nashville, Tenn., and W. C. Doering, vice-president Southern Wheel Co., St. Louis.

In connection with the congress, which was held in the Public Hall, there was a large exhibit by manufacturers. This included among other products mine cars and locomotives, conveying and transmission equipment, ball bearings and welding apparatus.

American Malleable Castings Association Meets in Cleveland

Trade and labor conditions were discussed at considerable length at the quarterly meeting of the American Malleable Castings Association held in Cleveland, Oct. 11, this being a joint meeting of the Eastern and Western members of the association. There were about 70 present, representing 50 foundries.

Reports made by members indicated that malleable foundries are now operating at about 75 per cent of normal capacity, or about the same as they have during the past 30 to 60 days. Many of the foundrymen expressed concern over the present labor situation. Their reports indicated a shortage of molders in most sections, but a fair supply of common labor—the reverse of the situation as it appeared a few weeks ago when molders were plentiful but common labor was scarce. The general feeling appeared to be that if foundries get back to normal operations, the labor shortage will

become acute, and that the plants will be unable to get enough men to take care of their orders.

A discussion of the fuel situation brought out statements that some malleable foundries had purchased considerable coal at very high prices, and that this fuel has proved of the poorer quality. This will tend to increase their operating costs.

Reports indicated that most of the orders for malleable castings are now coming from the railroads and the automotive industry. There has been some improvement in the demand for general machinery and industrial castings, but no pickup in orders from the agricultural implement manufacturers. Foundries specializing in castings for car manufacturers are crowded with work. Orders from the railroads for castings for repair work fell off during the shopmen's strike, but the railroads have again commenced to buy to some extent.

Plans for Scrapping 226 Wooden Vessels

WASHINGTON, Oct. 17.—The Western Marine & Salvage Co., with headquarters in Portland, Ore, is contemplating the scrapping of 226 wooden vessels at the plant of the Virginia Shipbuilding Corporation, Alexandria, Va. The Salvage company recently purchased these ships from the Government for $862,000. They were built by the Government at a total cost of $300,000,000. Negotiations are proceeding between the Salvage company and the Trent Amalgam Co., present lessee of the Alexandria plant, for a lease of a part of the property to be used in scrapping these ships.

J. M. Barde, general manager of the salvage company, plans to dismantle 10 ships at a time. To show the magnitude of the undertaking, Mr. Barde has furnished the following figures:

There will be 12 miles of smokestack; 150,000 to 200,000 tons of scrap iron and steel; 5000 tons of brass and copper; 12,000,000 ft. of cable wire; 2500 miles of piping; 162 Ferris type 1400-hp. engines; 64 turbine engines; 226 brass condensers; 452 water tube boilers; 2260 steam pumps; 9000 tons of water tanks; 5000 drill presses, anvils, vises, etc.; 1800 steam winches; 600 tons of rope; 12,000 steam and air gages, and 5500 tons of anchor chain. About 250 men will be employed on each vessel and the work will require 10 years, it is expected.

A large amount of warehouse space will be required for material, which will be held until conditioned and made salable. The hulls will be put in condition and sold for barges. It would cost about $150,000 to build these hulls to-day. They will be sold for $2,500 to $5,000.

The biggest problem ahead of the salvage concern is how to condition the material taken from the ships so as to make it ready for market. The company expects to dispose of most of its salvage in Europe, since, Mr. Barde says, "Americans don't take advantage of bargains when they see them nearly as quickly as the Europeans."

The Trent Amalgam Co. will continue to use a section of the shipyards.

Sales of Government Surplus Material

Final opportunity to purchase surplus material from the United States Shipping Board will be afforded by the auction sales to be held Nov. 1, 2 and 3, at Hog Island, Pa., and Nov. 22, at Sparrows Point, Md., according to Sidney Henry, sales director, Emergency Fleet Corporation. The property to be sold at Hog Island consists of three 160-ton refrigerating plants built by the Shipley Mfg. Co., York, Pa. These are of the carbonic acid type and each unit was designed for a frozen meat steamer of about 320,000 cu. ft. insulating space. Each plant consists of 2 80-ton refrigerating machines driven by a tandem compound steam engine. In one lot there are approximately 40,000 high speed and carbon drills and reamers. There is also a considerable amount of machinery, including turret lathes, flanging presses, forges and furnaces. For further information address J. T. Eason, sales manager United States Shipping Board Emergency Fleet Corporation, Hog Island, Pa.

New England Foundrymen Meet

About 70 members and guests attended the October meeting of the New England Foundrymen's Association, held Wednesday evening, Oct. 11, at the Exchange Club, Boston. H. P. Blumenauer, Arcade Malleable Iron Co., Worcester, Mass., gave an illustrated talk on moving materials, his remarks being based on plant improvements at the Worcester foundry.

Previous to his association with the foundry industry, Mr. Blumenauer represented the Standard Oil Co., New York, in India. Departing from the usual line of discussion of the subject, Mr. Blumenauer compared methods of handling materials in this country and in India. The pictures of India were in natural colors, highly interesting and instructive. One of the most significant of Mr. Blumenauer's remarks related to the improvement in the cost of handling fuel from cars to furnace at Worcester, a reduction being made from 86c. to 4c. plus, per ton; also the great saving in man power in transporting fuel from stock piles to furnace.

The record for handling fuel from cars to furnace, a distance of 1000 ft., was given as 40 tons per min., transportation being by 5-ton trucks. Other subjects discussed were: Truck tractors supplemented gangs of men at fuel storage piles. Portable molding machines, pneumatic annealing-furnace charging equipment, the method of delivery of work from the molding floor to trimming benches, shipping room arrangement which permits repairs on motor trucks while being loaded under cover, sorting and shipping bag holder stands, and the dumping of work from sand blast machines in a way to eliminate extra handling charges.

E. H. Ballard, General Electric Co., president, presided at the meeting of the association. C. B. Conneiley, commissioner Department of Labor and Industry, Harrisburg, Pa., will be the speaker at the November meeting.

Week End Employment of Students in Steel Plant

To assist students working their way through Carnegie Institute of Technology, the Jones & Laughlin Steel Co., Pittsburgh, has arranged to employ students in the steel mills on Friday and Saturday nights or all day Saturday. The shifts are of 10-hr. length. The arrangement is expected, of course, to give to students in the college of engineering some practical as well as theoretical knowledge.

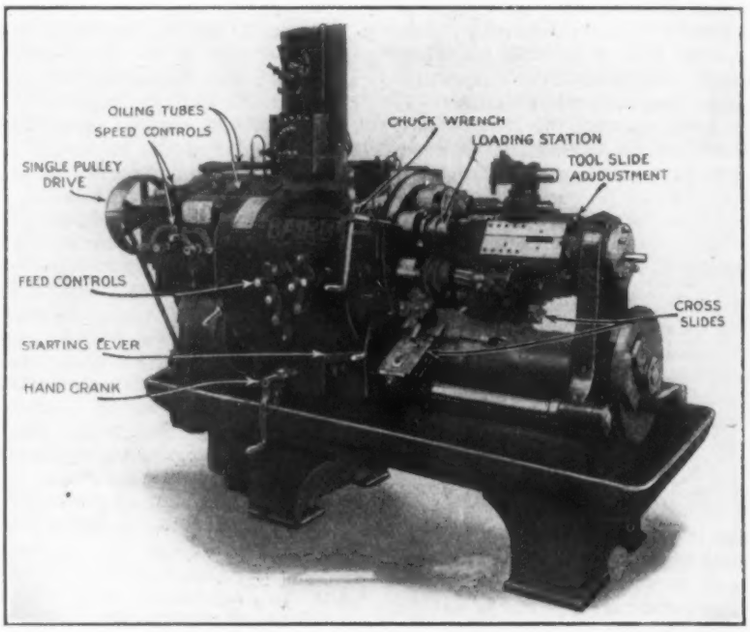
Fluorspar Investigations

The importance of fluorspar in the steel and ceramic industries is so great, and accurate information on methods of mining, milling, and utilization, and on costs of production and possibilities of future production is so lacking, that it has been considered advisable by the Bureau of Mines to investigate all phases of the fluorspar industry in the United States. At the request of, and in company with several eastern fluorspar producers, examination has been made of the principal fluorspar deposits of the western states. This examination was followed by an intensive study of the producing mines in Illinois and Kentucky. It was found that most of the deposits in the far western states were small and could not be relied on to produce much surplus over the needs of the western states. Costs of production in the Illinois-Kentucky field have increased greatly, owing to the increasing depth of the principal mines, the large amount of water that must be pumped, and the increased costs of labor and supplies. A report on all phases of the fluorspar industry is in preparation.

A voluntary increase of 10 per cent in wages has been granted by the Superior Gas Engine Co., Springfield, Ohio. The employees number about 500 and the wage increase applies to hour men and others on premium work.

New Six Spindle Chucking Machine

The Baird Machine Co., Bridgeport, has placed on the market the machine illustrated, which although of the general type classed as chucking machines, might be termed "an automatic lathe for short pieces." It is for work on castings, forgings and cut-off bar stock requiring a number of operations such as turning, facing, chamfer, form, drill, bore, ream, thread or other regulation lathe work.



New Chucking Machine for Short Pieces. Five pieces of work are handled at one time and 21 cutting tools may be used. There are 24 spindle speeds and 17 speeds for feed of the cutting tools

Five pieces of work may be operated on at one time, and as many as 21 tools can be used at one time. Five spindles are in an operating position and a sixth in an unloading or loading position. As the finished piece reaches the unloading position the machine automatically stops so that inattention on the part of the operator will not be the cause of a second cycle of operations on the work. The machine can be started immediately and the five work spindles need not be stopped to remove the finished piece or put in a new one. The machine can also be set to run without stopping.

The speed of the driving pulley is 800 r.p.m., and the spindle speeds are 28½ to 440 r.p.m., spindle speeds between these limits being obtained by eight possible combinations of the drive gears and three of the spindles, giving a total of 24 speeds. Any spindle may be run at any one of the three speeds. For example, should the combination selected require that one spindle should operate at 20 r.p.m., each of the remaining spindles might be operated at speeds of either 20, 30 or 40 r.p.m.; any spindle at any one of these three speeds. In addition there are 17 speeds for the feed of the cutting tools. Both spindle and tool feed changes are by change gears.

The minimum productive speed with driving pulley at 800 r.p.m. would be one piece in 9 min., the maximum being 2⅔ pieces per min. It is to be noted that the spindle and feed speeds can be arranged to give the greatest productive speed for the work in hand. A hole of small diameter can be bored at a high rate of spindle and cutting speed, and at the same time the outside diameter of the work might be turned at the best speed for that operation.

The machine can be arranged for either belt or motor drive, a 5-hp. motor being required. The tool holders are designed to receive standard forged or inset tools, and tool holders are interchangeable. The features include single pulley drive, all-geared speeds and feeds, automatic control, rapid traverse or reverse, power pump lubrication and power pump for cutting lubricant. The floor space occupied is 93 x 46 in., and the weight approximately 8500 lb.

The causes and effects of fires or explosions, due to the ignition of coal dust from the use of pulverized coal as a fuel at a number of industrial plants have been investigated by L. D. Tracy, coal mining engineer, of the Bureau of Mines. A bulletin on the general subject of coal dust explosion hazards in industrial plants will be issued by the bureau at a later date.

Dolomite for Refractories

If the lime in dolomite can be combined so as to render it nonslaking and at the same time hold up the refractoriness of the material, the abundant deposits of dolomite in the country would be rendered available for extensive use as a basic refractory, according to the Bureau of Mines. Briquettes containing 90 per cent dolomite and varying percentages of iron oxide and clay have been burned by the Bureau of Mines at the ceramic experiment station, Columbus, Ohio. Slaking time tests were run and the results plotted on a triaxial diagram. The slowest slaking mixture was selected for making into bricks, which were burned to a high enough temperature to render the lime inactive. Bricks with a high fusion temperature and high specific gravity, great mechanical strength, and low porosity were the result. The work is being continued, using varying percentages of dolomite to determine the nonslaking areas over the entire field.

Smelting Molybdenum Ore in Washington

A smelter for molybdenum ore is to be erected in Vancouver, Wash., by the United States Molybdenum Metals, Ltd., according to John O. Bender, secretary, of Los Angeles, Cal. A site has been purchased on the Columbia River waterfront and construction of the plant will start about Jan. 1, 1923, Mr. Bender stated. The molybdenum mine owned by this company is one of the five in the world and is located 65 miles from Vancouver at the base of Mount St. Helens. It will be necessary to bring out the ore on pack horses or mules a distance of seven miles, and haul it to Vancouver by truck. It is hoped to send out four tons of concentrates daily, which will mean an output of $1,000,000 per year, the price of molybdenum being around $850 per ton.

Ground Broken for Steel Mill

ST. LOUIS, Oct. 17.—George W. Niedringhaus, president National Enameling & Stamping Co., presided at the ceremonies incident to breaking ground for the new sheet mill to be erected by the company at Granite City, Ill., last Thursday. W. W. Hanlon, plant superintendent, to whom Mr. Niedringhaus gave credit for the idea of the plant, moved the first shovelful of earth. Philip Stremmel, superintendent of the tin mill department, also spoke.

The plant, 300 x 800 ft., will cost $1,225,000. It will contain six sheet mills and one large jobbing mill. It will add 700 employees to the pay roll. It is expected that the plant will be ready for operations by July 1, 1923.

The Underwood Typewriter Co., Hartford, Conn., is on full time. Heretofore the plant operated nine hours per day, five days per week. Five hours each Saturday has been added, making a total of 50 hours per week.

American Factory Methods Regarded Superior to British

A trip was recently made through the eastern part of this country, visiting various manufacturing concerns, by A. T. Davey, secretary of the Institute of Production Engineers, and associate editor of the British technical journal known as *Engineering Production*. The reason for the trip was to compare American production methods with those in use in England. Two of the plants visited by Mr. Davey were the Hendee Mfg. Co., builder of the Indian motorcycle and the Rolls Royce Co. of America, which builds the Rolls Royce car, the latter plant having been somewhat recently established in this country by the British parent company.

The British factory manager, he holds, is not able to figure costs accurately, a matter of prime importance among American manufacturers, owing to lack of production methods and neglect to study scientific management of factories as practiced in this country. He says that in the usual British machine shop there is no definite planning of work nor routing of materials through the shop and that often it is impossible for the management to give definite completion date or to estimate accurately the length of time a job will require to pass through the various machining operations.

British Worker Cannot Compete in Production Volume

Mr. Davey said that while the British worker as an individual is more painstaking and careful in his work than the average American worker, he cannot compete when it comes to turning out volume of product in a short time. Further there is considerably more hand work done in British factories than in similar factories in this country, according to his observation. It appears to be the aim of the average American shop to be so organized that hand work is almost entirely eliminated, work being done in automatic machines or fixtures.

Mr. Davey considers that many British managers look upon scientific management as a mere fetish without actual value in production, not realizing that it is scientific management which has made possible the remarkable production capacity of this country. He believes that when they fully realize in England what scientific production methods will mean, they will undoubtedly adopt them in their British factories.

Industrial Housing Conditions

Mr. Davey finds that working conditions and housing conditions of American workmen are far superior to those prevailing in England. No assistance is given the British worker to make his conditions more comfortable, such as is the practice here. For instance, individual lockers, washrooms, rest rooms, lunch rooms, etc., are practically unknown in England. The use of these helps in this country, he finds, has spurred the American factory worker to greater efforts, the British worker still clinging to the old policy that more production will mean less work to be done. It follows that there is more soldiering going on in British factories because the worker fears lack of employment if he produces rapidly or completes quickly the task on which he is employed.

He says that both in England and on the Continent the working man generally lives in crowded streets with unhealthy and insanitary conditions surrounding him and that his chief amusement is to sit in front of his house and smoke, whereas in this country the working man benefits by latest sanitary conditions, is enabled to have a cottage or a small house with some little ground about it and has means at his disposition for a variety of amusements, in many cases owning an automobile which in England is frequently impossible, even for a foreman.

Mr. Davey feels confident that the work of the Institute of Production Engineers will eventually greatly improve manufacturing conditions and the condition of the working man in England.

Apparatus for Determining Linear Shrinkage and for Bottom-Pouring of Cast Metals and Alloys

In a paper before the Institute of Metals, in Swansea, Sept. 22, F. Johnson and W. G. Jones describe two new forms of apparatus:

(a) For determining the total linear shrinkage of cast metals and alloys;

(b) For producing cast bars by a bottom-pouring method, the molten metal flowing from a specially heated crucible into the mold and the rate of flow being controlled by a lever-operated stopper.

Both forms of apparatus have been used in investigating the shrinkage and hardness of chill-cast copper-zinc alloys. The shrinkage values of these alloys are found to be higher in general than those obtainecd for sand-cast bars by previous investigators. The curve illustrating the relationship of shrinkage to composition confirms most of the features formerly discovered by Turner and Murray, but no minimum at 60 per cent copper is found.

In making the alloys pure electrolytic metals were used, while re-melted castings were excluded. Most of the alloys were poured at a temperature interval of approximately 115 deg. Cent. (239 deg. Fahr.) above their liquidi, and the mold was kept at a constant temperature by means of an outer jacket of water maintained at the boiling point.

The alloys were prepared in a separate coke-fired melting furnace and transferred thence to the bottom-pouring apparatus. The advantages afforded by the use of this apparatus include:

Control of pouring temperature;
Facility for registering temperature of metal;
Absence of delay between attainment of required pouring temperature and release of metal into the mold;
Control of rate of pouring;
Exclusion of dross from stream of metal, thus obviating the necessity for skimming;
Mitigation of "zinc-fume."

The hardness of the bars was determined, both as cast and after annealing. Uniformity was not exhibited by the bars as cast, but was secured by annealing. In the case of the annealed bars, the hardness numbers both by the Brinell and Shore (scleroscope) methods were plotted against composition. The Brinell curve showed an increase of hardness over the range 100 to 88 per cent copper. From 88 to 72 per cent copper the hardness was constant, a slight fall setting in at about 72 per cent copper and persisting to 63 per cent, at which point a rapid increase set in with the appearance of the beta constituent. With the exception of a small dip in the curve between 53 and 50 per cent copper the increase is maintained to 45 per cent copper.

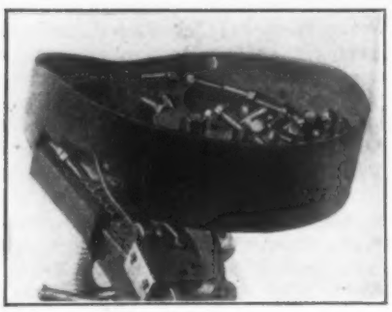
The changes of scleroscopic hardness with composition are of a similar character to those revealed by the Brinell test, but less pronounced, while over the range 60 to 53 per cent copper no increase of hardness is shown, such as that shown by the Brinell test. This would indicate a very slight difference scleroscopically, between the beta and alpha phases. The top faces of the bars as cast are slightly softer than the bottom faces, owing to slower rate of cooling, and although this difference is diminished by annealing, it is not entirely eliminated in every case.

The annealed bars (containing 100 to 57 per cent copper) were cold-rolled, the reduction in thickness being approximately 50 per cent. The hardening capacity of the alpha brasses under cold work increases rapidly with increase of zinc up to a maximum of about 75 per cent copper. The rolled strips after close annealing were again tested for hardness, the results confirming those obtained on the bars as cast and annealed, with the exception that the range of uniform hardness is slightly restricted and the succeeding fall (between 70 and 63 per cent copper) is more pronounced.

New Machine for Shaving Bolts and Screws

A new machine for shaving bolts, cap screws and similar work and equipped with its improved automatic hopper, as shown in the accompanying illustration, has been brought out by the Asa S. Cook Co., Hartford.

The head of the bolt is shaved both over and under simultaneously, assuring a uniform thickness of the head. This is accomplished by the new rocking tool holder shown, which permits of the independent adjustment of each tool, either sideways or at different angles from the center line of the bolt, but working simultaneously. The tool holder is supported on an angle that keeps the tools from dragging on the finished surface on their return strokes. A stop provided for each tool serves to keep the tool in the proper place at all times. The bolt is held in jaws by the end of the shank, and is back-rested by an unusually solid back



Machine for Shaving Bolts and Cap Screws. The general arrangement of component members may be seen above and details of the hopper in view at left

rest, permitting the head to be machined true with the body.

Any style of head can be shaved. The capacity of the machine running at 350 r.p.m. and set on blanks not larger than ½ by 4 in., is 18 per min., greater production being obtained on smaller diameters. Starting and stopping is by means of a clutch pulley, and overhead belts are eliminated by placing all shafting underneath the machine.

New Hopper for Feeding Bolts

The design of the hopper involves a new idea in feeding bolts and cap screws, unusual speed and efficiency being claimed. Unlike the revolving hopper, the new device functions by means of a stationary groove with a revolving bottom. The groove is made wide enough to accommodate only one bolt at a time, and the hopper itself is built on an angle, forcing surplus bolts to slide back from the top of the groove. The revolving bottom is equipped with steps at regular intervals which catch the heads of the bolts. Agitators, which revolve with the revolving bottom and close to the surface of the stationary disk, stir up the bolts and serve to assure a steady stream of work in single file, disposing of every bolt. The bolts may enter the groove in the chute head first or point first, because as they enter their points drop, and, held by their heads, they continue in this position.

The hopper can be regulated to run at various speeds. On a test of ½ x 2 in. cap screws 105 per min. were fed, emptying the entire hopper to the last bolt at a uniform speed throughout.

Either right or left feed is available, and the hopper can be adapted to any machine requiring a bolt feed hopper. It will take bolts up to 6 in. long, and by changing the chute to suit, various diameters of head may be accommodated.

Detroit Stoker Co. Buys Plant at Monroe, Mich.

The Detroit Stoker Co., Detroit, manufacturer of automatic stokers, has recently disposed of its plant in Detroit and purchased from the Van Blerck Motor Co. its entire manufacturing plant located in Monroe, Mich., where it will continue to manufacture automatic stokers. The general offices, sales and engineering departments will be continued in the General Motors Building, Detroit. All equipment and materials are being moved to Monroe and a large amount of new equipment and machinery is to be installed. The company now manufactures both underfeed forced draft stokers and overfeed natural draft stokers, and due to the increase in business and the necessity for increased facilities, has found it necessary to enlarge its quarters. The new works consists of modern fireproof buildings, including a large machine shop, erecting and assembling shops, as well as separate buildings for heat treating and sheet metal work. The buildings are all one story, and contain 50,000 sq. ft. of floor space. The land comprises nine acres suitably located, with New York Central trackage on the property, and with ample space for future expansion.

Acquire Control of Columbus-McKinnon Chain Co.

Charles M. Wambaugh and associates, all residents of Columbus, Ohio, have purchased the controlling interest in the Columbus-McKinnon Chain Co., as the conclusion of negotiations which have been pending for several months. The general office and financial management of the firm will remain in Columbus.

The controlling stock in the company has been held in Buffalo since the consolidation of the Columbus Chain Co. and the McKinnon Chain Co. Mr. Wambaugh will continue as president and general manager of the combined industries and the men associated with him since the organization of the Columbus Chain Co., 20 years ago, will remain on its board of directors.

The Columbus-McKinnon Chain Co. owns and operates plants in Columbus, Lebanon, Pa., and St. Catherine, Ont. It is one of the largest manufacturers of both electric and fire welded chains in the United States, making all sizes. The company recently installed equipment for the manufacture of automobile tire chains.

Investigation of fire brick in malleable iron furnace bungs has been continued by the Bureau of Mines in order to translate laboratory results for users of clay refractories in malleable iron furnace practice. Different types of fire brick were found to stand 3 to 22 heats. The standard laboratory tests for fire brick did not show this difference, so a thorough study of the relation between the laboratory and service tests were made to assist the manufacturer in the utilization of fire clays for malleable iron furnace brick. The brick giving the heat service had a porosity between 1.9 and 2.3 per cent. Those brick showing the smallest spalling loss stand up best in practice.

Transportation Is Most Important Factor

Trade Paper Editors Review Business Conditions and Say Much Depends Upon Car Supply—How Various Industries Are Affected

AT a meeting of the National Conference of Business Paper Editors held at the Hotel Astor, Oct. 12, brief reviews of business conditions in ten basic industries were read by editors of representative trade papers. The following are abstracts of a number of these reviews:

The Railroad Situation

BY SAMUEL O. DUNN
Editor Railway Age

By long odds the most outstanding feature of the present railway situation is the inability of the railroads to move the freight being offered to them. The farmers cannot ship the crops they already have harvested, and the wheat has not all been threshed and the corn is not yet gathered. Every single industry in the country is reporting that its shipments, and many that their production, are being restricted by lack of transportation.

I wish I could assure you that this situation is due to temporary conditions and that it will soon be improved. I cannot do so. The coal strike has created an abnormal demand for the transportation of coal. The railway shop employees' strike has left all the railways somewhat crippled and some badly crippled. These things have made the shortage of transportation greater than it otherwise would have been, and their effects cannot soon be removed.

But the fact is that, although the coal strike and the shop employees' strike have aggravated the present transportation situation, they have not created it. It is mainly due to two series of developments. The first of these is the very large increase within recent months in industrial and commercial activity and, in consequence, in the freight offered to the railways for movement. The second is the long decline which has occurred in the expansion of the railroads. If all the locomotives and cars now owned by the railroads were in normal condition, they could not handle anywhere near all the freight that is being offered to them, and which, in the months ahead, will be offered.

It was long predicted by those who opposed the policy of restrictive railway regulation that in time it would result in making railroad transportation the limiting factor in production and commerce in this country. That prediction, unfortunately for everybody, has now been completely fulfilled. Almost every other condition is favorable to an increase of production and a revival of prosperity such as we had after the panic of 1893, after the panic of 1907 and after the depression of 1914 and 1915. The railroad situation makes impossible for the present any such increases of production and commerce as occurred then.

This limitation upon the country's prosperity and development must be removed. How can this be done? The answer is simple and obvious. The influences which have reduced and almost stopped the expansion of the railroads must be removed. Much the greater part, or all of this reduction of the expansion of the railroads, has been due to the policy of government regulation which has greatly reduced and narrowly restricted the net return earned by them. This reduction and restriction of their net return has driven new capital from them. Unable to raise new capital in relatively as large amounts as in former years they have been unable to develop and increase the capacity of their properties as formerly.

The public long has been told that the railroad problem of this country was ceasing to be one of rates, and was becoming one of lack of transportation. The public, however, has insisted in regarding the problem as chiefly one of rates and in consequence cannot now get, and for a long time will be unable to get, anywhere near enough transportation. It will lose many times more in a short period by this lack of transportation than it has gained in the last ten years by keeping rates on a basis which has almost stopped railroad development.

Do not in this crisis denounce the managements of the railroads. The farmers and business men and the regulating authorities who have done what the farmers and business men have demanded are the people who are responsible. There is no immediate remedy for the present transportation situation. It must be borne as best it can. It can be remedied in time by the adoption of a wiser and fairer policy which will let the railways earn the net returns they require in order to furnish adequate service. There is no other remedy under private ownership, and very few business men wish to take a chance with Government ownership.

Iron and Steel

BY A. I. FINDLEY,
Editor THE IRON AGE

Iron and steel production to-day is largely a function of car supply. Transportation is not yet untangled from the coal and railroad strikes and is not likely to be for some time. The coal strike at its worst brought the industry down below a 50 per cent operation. The recovery was rapid in September and to-day, with all the hamperings of car scarcity, the output rate is something over 70 per cent of capacity. With more than three-fourths of the year gone, we are able to estimate the total production for 1922. It promises to be around 32,000,000 tons of steel ingots as against something over 19,000,000 tons last year. We called 1921 a 40 per cent year. We are safe in putting down 1922 as a 60 to 65 per cent year.

Demand.—The railroads and building have been the main props of the steel industry this year. Up to the second week of October the railroads had bought nearly five times as many cars as in all of 1921, and contracts for locomotives by the hundreds have been coming in in the past three months. Already fully 1,500,000 tons of rails have been bought to be put in track in the first half of 1923. Large structures and new residences have called for much structural steel, gas and water pipe, sanitary equipment and builders' hardware. Automobiles have been built at an unexpected rate, with several months making new records. There are still in dealers' hands agricultural implements manufactured in 1920, but these stocks have nearly disappeared and implement works have made a fair start on the road to better things. Oil tank storage work has helped to make up to the plate mills what they have lacked in orders from shipyards. In those uncounted and common uses of steel, touching the every-day life of the people and altogether representing fully 25 per cent of the total consumption, 1922 has shown a noteworthy gain, as indicated in part in the sheet, tin plate and wire trades.

Prices.—Costs are so high that producers of steel have had little profit in 1922. A number of independent companies have shown balances in red ink for all three quarters of the year. Labor is now 20 per cent higher than in the summer months. The 10 per cent horizontal reduction in freights was admittedly an injustice to iron and steel producers, many railroad men agreeing that rates on coarse freight never should have gone up 40 per cent in 1920. Most burdensome of all has been the high cost of fuel, due to the double

strike. Before the war the steel industry could make a profit on 1¼c. per pound for bars, plates and shapes. To-day's market prices on these products are around 2c., and some mills have all they can do to break even. Due to the coal and railroad strikes, there has been a scarcity market for pig iron and steel products for many weeks. How fast the mills can catch up will depend on how fast the railroads can get their rolling stock in order and master the dislocations due to the priority movement of coal. To-day the composite price of seven main finished steel products is 2.46c. per pound, as against 2.23c. one year ago. Pig iron is quite out of line with steel, having made a rapid ascent due to the widespread blowing out of furnaces that could not get coke. Thirty dollars and ninety-four cents ($30.94), the pig iron composite of Oct. 10, was about 55 per cent above that of October, 1921, as against only 10 per cent advance in finished steel over one year ago.

Outlook.—Steel mills have promise of continuing the present rate of operations—that is, 70 per cent and a little upward, well into the winter. There is no accumulation of steel in the country to speak of, and middlemen's stocks of a good many descriptions of finished product have been broken, in the period of short supply during and following the strikes. There is, of course, surplus capacity in the country, but it will not have the chance to make itself felt because labor supply, fuel supply and car supply will continue to limit the industry. Prices are not likely to change materially in the next four or five months. Pig iron having advanced so much will show more decline than finished material, as the industry works out from its fuel and railroad hamperings. Earnings in the fourth quarter are likely to be the best for the year and the first half of 1923 should show as good a volume of business as today's and a return of moderate profits.

Industrial Chemicals

BY WILLIAMS HAYNES

Editor Drug and Chemical Markets

During the past two years, in spite of the great stress of the period, the industry as a whole has come through soundly. The tremendous over-production of the war period has been curtailed; war prices have been brought back; selling policies have been revised, all with surprisingly little open disturbance. Failures have been comparatively few. Production has been worked out upon a reasonable scale, based upon actual consuming demand. Competition has forced careful scrutiny of manufacturing processes. Second-hand dealers, who throughout the war period were in control of the market, have lost their domination and the more healthy condition of a market in the hands of the actual producers now exists.

Chemical prices, like many other basic commodity prices, have always been set by bargain. There is a marked tendency—although it is not yet more than a tendency—for chemical makers openly to announce their price. Makers of alkalies have been pioneers in this movement, and it is rather significant that within the past two years five great chemical companies—one nearly one hundred years old and the youngest organized more than twenty years ago—have for the first time adopted and are using trademarks. This branding of chemicals, for identification by the consumer, is the first step toward a revision in commodity sales methods that means much to both producers and consumers of the raw materials of industry. It means that there will be less emphasis upon price and greater consideration of the other factors that make up true value. It means better control of prices and less violent price fluctuations. It is a movement that has the vigorous endorsement of the National Association of Purchasing Agents, who recognize that it was in the haggling, bazaar type of market that the age-old saying, "Let the buyer beware," was born. It is a movement that has attracted attention in other basic commodity fields, and as the merchandising of all these raw materials of all the industries lies close to the very root of successful manufacturing, it is a movement full of meaning to us.

Metal Mining Industries

BY J. E. SPURR

Editor Engineering and Mining Journal

The great test of prosperity for the mining industries during the next year will depend upon how far the United States is self-sufficient. Undoubtedly it is a world in itself—undoubtedly it constitutes more of a commercial closed circle than has ever been seen before within single national boundaries. How far will our own consumption take care of our own production of the non-ferrous metals? And in this consideration the present tariff policy of the United States is the chief factor. Since its effect is to raise prices and wages—prices and wages which in many cases have already risen since the passing of the tariff, as if on the touch of an electric button—it is evident that the only theory of the tariff—if there ever was an intelligent theory—is that the domestic consumption is sufficient to take care of production. Certainly the consequent increase in the cost of production cripples our chance to sell cheaply in competition in foreign markets. Then of course there is the universally pointed-out factor that by shutting out foreign goods from our markets we prevent foreign purchases on account of the lack of wherewithal to buy our products. This applies especially to some of the great non-ferrous metal industries. We mine most of the world's metals, producing normally 60 per cent of the copper, 45 per cent of the lead, and so on; and we have had to depend for the prosperity of some of our principal metal industries largely upon the aid of foreign markets directly or indirectly. Possibly our increased consumption may take care of a part of the produced surplus of commodities in the next few years. Only time can tell. In the meantime, however, Germany, normally the greatest consumer of metals after the United States, has lately become a very weak factor as a buyer, on account of the collapse of the mark; and, altogether, our prospects for foreign markets are not too bright. The general European debt or bankruptcy in the several countries, and our own tariff policy, is clogging that outlet for our production.

Marine

BY R. V. SAWHILL

Editor Marine Review, Cleveland

Surface indications do not afford a clear picture of conditions in the marine field. The troublesome liquor issue, the delay in solving the subsidy question, the eager competition for freight business at low rates, the slight amount of ship construction, all point toward a serious and unsatisfactory condition. Every American in the business feels the effects of these issues and has trouble in winning back the optimism of a few years ago.

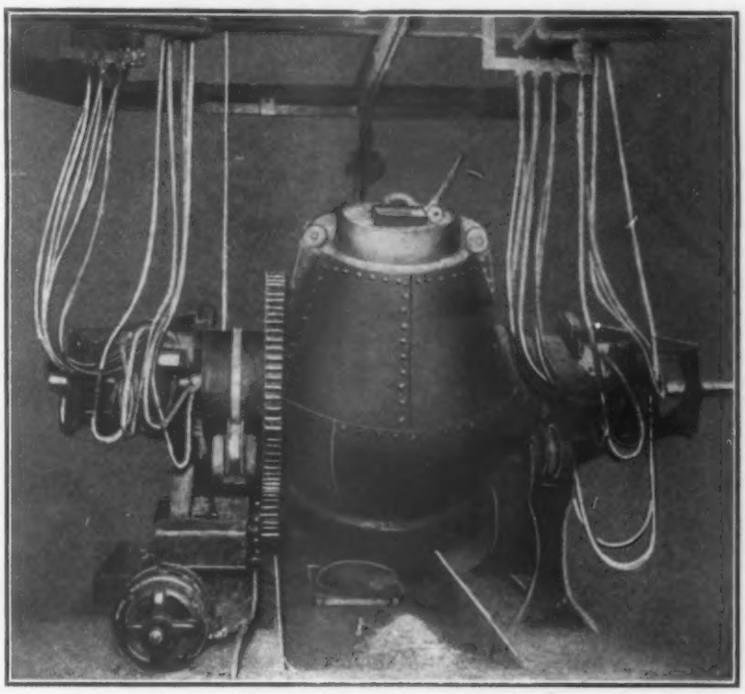
The liquor issue will probably be settled within a few months, with foreign ships released from the Daugherty interpretation. The subsidy question is up before Congress within a few weeks and the united efforts of practically every branch of the marine field, as well as the support of the Washington administration, will likely bring some modified law into effect. Increasing foreign trade is strengthening freight rates, but world conditions are not improving at the American pace so that to world ship owners profits are not likely to rise.

But fundamentally American ship owners and shipbuilders have one solid basis for encouragement. Domestic industry has grown beyond the domestic market and America must seek outlets for her surplus products in foreign countries. This condition has been the economic fact which always has made other nations powers on the ocean. With a physical fleet in her possession, with better trained shipping and shipbuilding organizations than ever before and with foreign trade a necessary part of her industrial life, the United States is certain to regain her strength on the seas despite the interference of minor influences which to-day appear both disturbing and important.

Electric Modification of the Schwartz Non-Ferrous Oil Furnace

The familiar oil burning brass melting furnace, known as the Schwartz furnace has been modified by the Hawley Down Draft Furnace Co., so as to convert it into an electric melting furnace. The new equipment is known as the Hawley electric oscillating furnace. The furnace is designed for melting non-ferrous metals and alloys. Its principal characteristics are as follows:

The heat is generated by an electric arc passing between two horizontal electrodes. This is really the so-called indirect arc type of furnace. The shell of the furnace is the same as that of the original Schwartz oil-burning equipment. The design is such as to permit pouring either into ladles or directly into molds and it can be charged either by hand or mechanical arrangement. Regarding the shape of the cauldron, the following advantages are mentioned: All the metal is melted equidistant from the arc; there is no possibility of the ends bulging, resulting in the electrodes becoming out of the alinement; the cauldron, being absolutely rigid, cannot lose its shape; the use of linings, which are interlocking and which can therefore hold together tighter, is possible.



The furnace is equipped with an automatic oscillating mechanism resulting in a thorough mixing of the charge while melting. The furnace as illustrated is now built in one size only, of 1200 lb. capacity and 150 kva. Two other sizes are being designed, of 600 lb. and 2500 lb. capacity and 75 kva. and 300 kva. respectively. A single phase transformer is furnished with each furnace, together with a motor for oscillating, and automatic and hand control mechanism, together with an integrating watthour meter and other necessary equipment. The lining of the furnace consists of three courses of special refractories. Suitable electrodes and electrode cooling devices are incorporated.

Tariff Data for Electrical Industry

The Tariff Commission has just issued a tariff information survey on the electrical industry. Intended as an aid to scientific tariff legislation, it presents briefly the pertinent facts as to the competitive situation of the industry in the United States and abroad. A brief survey of the whole industry is followed by a separate and more detailed consideration of the more important branches. Power apparatus, incandescent lamps, automobile apparatus, wire and cable, wiring devices, lighting fixtures, batteries, medical apparatus, and miscellaneous supplies are given detailed treatment. Domestic production in 1921 was valued at approximately one billion dollars, of which 10 per cent was exported. Copies of this publication may be procured from the Superintendent of Documents, Government Printing Office, Washington, at 10c. per copy.

Mill Cinder Freight Rates

Mill cinder at one time moved freely from New England and other Eastern points to eastern Pennsylvania steel plants, but of late there has been comparatively little business done, especially where there is a fairly long freight haul, on account of the high freight rate. The price which consumers are willing to pay for mill cinder varies from $3.20 to $3.50 per ton delivered at consumers' works in eastern Pennsylvania and the freight rates from all New England points east of Port Chester, N. Y., is $3.91. Under these circumstances, there is no chance for New England producers of mill cinders to dispose of this product. Dealers have endeavored to get a reduction of freight rate on mill cinder from the New York, New Haven & Hartford Railroad, but without success. The various producers in New England have also had the matter up with the railroad. The road answers that mill cinder is grouped with pig iron and that to reduce the mill cinder rate it would have to reduce the pig iron rate also. As a consequence, mill cinder in New England is now being hauled to the dump or used as ballast on railroads.

Briefs Filed in Rate Case

WASHINGTON, Oct. 17.—The brief of opposing railroads has been filed with the Interstate Commerce Commission regarding the proposed rate of 20c. per 100 lb. from New Orleans and group points to the Houston-Galveston-Beaumont, Texas, group on iron and steel articles. The brief points out that the application is limited to traffic originating beyond and delivered to rail lines at New Orleans and group points by connecting rail lines, by coastwise or ocean vessels and by the Mississippi River, but it will not apply on import traffic. It is, therefore, a proportional rate, at least, as to traffic delivered to the west side lines by the rail carriers, the brief says.

Supporting contentions of the carriers opposed to the 20c. rate, the St. Louis Chamber of Commerce also has filed a brief in which it asks that the proposed tariffs be canceled. The brief of the chamber states that it is sought to secure tonnage from the Birmingham and Pittsburgh districts to the Houston group, but that there was no real desire or hope of securing tonnage from St. Louis under the proposed adjustment because the proportional rate from New Orleans to Houston would not reduce the rate from St. Louis.

The most accurate method of determining the total heating value of a coal sample is by cumbustion in a bomb calorimeter, states the Bureau of Mines in Bulletin 193, just issued. The instrument should be carefully standardized by burning substances of known calorific value, such as the standard stamples of cane sugar, napthalene and benzoic acid, that are now being furnished by the Bureau of Standards. The standardization should be conducted under exactly the same conditions and with the same thermometer that is used in the tests. The use of calibrated thermometers is essential. In carefully conducted calorimetric work the probable error should not exceed 0.2 per cent, which corresponds to about 30 B.t.u. in a high-grade coal. This degree of accuracy is higher than the 100 B.t.u. often obtained in the usual methods of sampling.

MACHINE SHOP ECONOMIES

Screw Machines at Brass Cutting Speeds—Other Practices of Eastern Machine Screw Co.

BY L. S. LOVE

W. H. GATES, of the Eastern Machine Screw Co., New Haven, Conn., manufacturer of self opening die heads, threading machines, etc., credits the economies he has worked out in that plant to his early experience in the old Ethan Allen gun plant.

In the Allen plant it was essential to make fixtures do as much of the work as possible, to avoid unnecessary handling, on account of low prices at which the product was sold. This same idea has been carried out in the Eastern plant. One example of this practice is a vise for holding four pieces to be milled at once. The blanks are not uniform and could not be held in multiple with the ordinary solid jaw vise. The vise used has a fixed solid jaw at one end; at the other it has four separate movable jaws held in an adjustable block. The four jaws are individually loosened or tightened by cams. In this manner a group of pieces can be milled at once, each held firmly in place.

A great deal of importance is attached to the treatment of steels in different ways to accomplish particular results. An example is the treatment of steels used for tools in automatic screw machines, permitting them to be run on steel work at speeds ordinarily employed in machining brass. With the special heat treatment for tools, it is possible to hold production jobs practically to tool room limits.

Another example of speed in production is the employment of an internal grinding attachment for small holes, running at speeds up to 120,000 r.p.m. This attachment is operated by an air turbine and runs without vibration.

Standardization and Bridge Design

In a paper before the Franklin Institute, Philadelphia, Ralph Modjeski points out one of the handicaps under which designers and engineers must labor when standardization of products reaches a high level. He said, in part:

"Because of the rapid growth of its railroads and the magnitude of its streams, the United States offers the greatest opportunity of any country for the development of the science and knowledge of bridge building. Unfortunately, we have now entered upon an era of standard specifications, and each engineering society of any size is bent upon compiling its own. Thus an engineer desiring to secure somewhat better material for his structure is met by objections from the manufacturer, who claims that if the standard specifications of such and such a society are good enough, the engineer should be content with them. This automatically arrests any effort on the part of the contractor to produce better material than what is known by him as 'commercial product,' and thus progress in the manufacture of materials of higher grade quality for bridge work is retarded. The material is not improving in quality—it is even deteriorating. Standard specifications are an advantage in many cases, but not in regulating the product of industries which are still almost in their infancy and in process of development."

Panama Canal Traffic

Figures have been given out for the traffic of the Panama Canal during the fiscal year 1922, and during the eight years of operation since the canal was first opened. It is interesting to note that Japan furnished the third largest tonnage of vessels passing through the canal in the latest fiscal year, having 1,044,515 cargo tons compared with 3,329,861 for Great Britain and 4,950,519 for the United States. These three accounted for 85.7 per cent of the total of 10,884,910 tons for the shipping of all nations. On the 8-year basis Norway, which stands fourth in 1922 with 408,268 tons, is a little ahead of Japan, having 4,112,451 tons against 4,047,034 tons for Japan, 21,555,924 tons for Great Britain and 24,030,335 tons for the United States, out of a total of 61,348,406 tons for all shipping.

For 1922, the cargo tonnage decreased from 1921 by more than 6 per cent, this decrease being approximately uniform with regard both to westbound and eastbound traffic. The number of merchant ships using the canal dropped from 2892 in 1921 to 2736 in 1922. The number of warships dropped at the same time from 16 to 14.

Michigan's Fuel Control Law

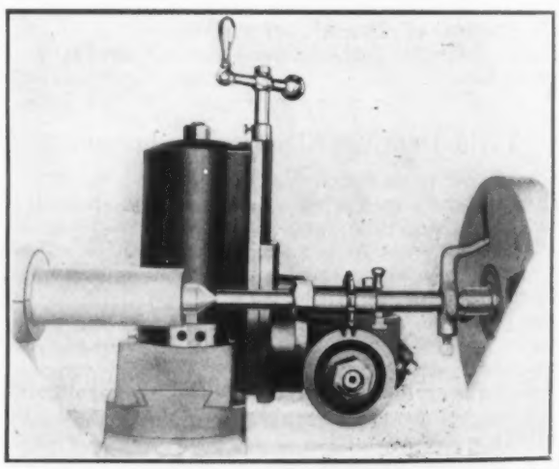
DETROIT, Oct. 16.—Michigan's fuel control law was finally passed by both houses of the Legislature, Friday, Oct. 13. The law becomes effective at once. It embodies the following powers in the office of the fuel administrator:

Supervise, regulate and control the receipt, storage, sale, use, distribution, production and delivery of fuel within the State; fix prices; compel the sale of fuel; ration fuel to dealers and districts; prevent waste; conduct investigations, search properties where fuel is held for sale, and inspect books and documents; require dealers to make reports; license dealers; deputize assistants.

Lathe Attachment for Milling

An attachment for lathes, planers, shapers and drilling machines, known as the Garrett millerette converter, has been placed on the market by the Production Machine Tool Co., Cincinnati.

The device is intended to permit of converting a lathe into a milling machine with a dividing head on which a large range of milling can be done, such as cutting spur and bevel gears, surface milling, angle cutting, spline and keywaying. With the attachment small shops may do many classes of milling machine work on their lathes, and in larger shops it can be used to save set up time on special and single-piece jobs. On the drill press the attachment accurately spaces the holes to be drilled and holds the work. On planers and shapers it is used as a dividing head. Three sizes are available, for lathes from 12 to 24-in. swing.



Attachment for Converting Lathe into Milling Machine with a Dividing Head. It is also adaptable to planers, shapers and drills

The index head in connection with the change gears provided is quickly set up, as only two gears are used at one time. The index plate is complete, showing the gears to be used and the required number of turns of the index handle to obtain divisions from 2 to 360.

The attachment fits the tool post slot in the top slide of the compound rest of the lathe and is quickly clamped. The lathe supplies the power and carries the cutter on an arbor between centers, furnishing both longitudinal and cross feed. In addition to the movement of the top slide and compound rest on the lathe, the down slide of the attachment is conveniently operated by the handle shown. The device can be set at any angle as both the down slide and index head turn on a swivel.

What Are Real Evils of the Long Shift?

Shorter Hours and Encouragement of Loyalty Urged by One Who Has Worked a Number of Years in the Mills—The Serious Problem of Morale Involved

BY ALDEN D. PERLEY

MANY eminent authorities are to-day thinking of the advisability of the eight-hour day for the continuous processes of the steel mill. Exhaustive reports have been published by such authorities as Bradley Stoughton and Horace B. Drury. I shall try not to encroach upon their field in this article, but merely try to give the viewpoint of one who has spent years at that kind of work. Of the nine years since I left College, I have spent all but the war days inside the mill. At least five of those years have been at double turn shift work, around blast furnaces, coke works and open-hearth furnaces, including most of the heavy jobs as well as most of the highly skilled jobs.

I believe there is no question that 90 per cent of the 12-hour men think they want eight hours, provided they can get ten hours' pay for it. This, however, has little bearing on the question, for it is evident that if the laborer got all he thinks he wants, we would rapidly approach the condition in Russia. Our question is, What are the evils of the long turn, would eight hours benefit the man or his family and what will it cost the public at large in the increased price of steel?

Much has been said about how hard or how easy the work is in the steel mill. The truth is that in nice, cool weather the work is easy for one who is accustomed to it. There is plenty of time for rest to make up for the strenuous pulls. A good man completely recovers between times. As the weather turns hot, the work around an open-hearth furnace becomes an ordeal for the very best men, and becomes harder in all departments.

I believe much more could be done to relieve this heat, especially in the open-hearth, and, of course, it will be done some day. But it still remains true that when it is the hottest and the work is very trying, the man working nights finds it almost impossible to sleep in such a home as he may have.

Despite the hard pull through the summer, however, the hot, heavy work is healthful, and one finds the young fellows holding down the heaviest jobs are in splendid health. It works out, fortunately so, that the young men get the heavy work and the older, more experienced men much lighter work.

Our modern steel mill has grown so large that it has developed some very striking faults of its own. It is often so large that men have a long walk inside the gates. The plant draws men from a great distance around it. Even laborers make a double change of clothes for their work, so that the average 12-hour man in many places is 13½ hours away from home. Allow him one hour for two meals at home and he has 9½ hours left for chores, recreation and sleep. Men given their choice work 14-hour nights and 10-hour days, which proves that the man does not mind the work; what he does want is some time at home occasionally. The 14-hour night allows the average man 8½ hours at home. He eats and goes to bed. Eats and goes to work. This brings in another one of the greatest evils of the 12-hour shift. It is very hard for the man away from home 13½ hours average a day to get proper food. Only the lower classes have any success. I find nearly all the skilled workers have stomach trouble in spite of the exercise they get.

I believe most writers overlook the fact that nearly all the necessary shift men are either semi-skilled or skilled men and not common laborers, and that from the semi-skilled men the skilled men are chosen. These men crave and expect some outside life as well as a home. Can anyone believe that in his 9½ hours free time the workingman finds any time for recreation without assuming he gets some sleep on the job? If we are to countenance sleeping in the mill more provision should be made for it, especially a warm place provided for cold weather. At present such sleep provides more in the way of colds than it does of rest.

If I may digress a little here, one of our greatest problems to-day is to keep up the morale and personnel of the skilled force. The whole trend of big factories is toward decentralization of loyalty and the obliteration of the individual. Men are loyal only to their boss, if to anyone. Each department works only for itself and often even for the destruction of rival departments. The individual becomes nothing, the boss feels he can lose his best man, his most loyal man, without worry to himself. The whole is so strong, the individual so weak, that very little discrimination is shown in picking men, or maintaining good-will. The organization becomes so strong it is top heavy in an emergency. Perhaps the rub comes in a general shortage of labor, or low wages in steel mills alone as compared to other industries or in a general strike. Then one sees what an organization without loyalty is worth and how little we can depend on the serfs of other nations.

In no other place does the American born take so readily to hard work as in the steel mill. There he finds pride as well as sweat in his work. He is more dependable and loyal, and spreads a better feeling, than either the Irish born or the southern European.

The cost of installing three shifts in place of

The Author's Long Service in Steel Plants

THE author of this article, Alden D. Perley, is a graduate of Yale, and with the exception of the service which he rendered as a soldier in war time, he was continuously employed in steel plants for the nine years since his graduation until very recently he resigned to go into business in Pittsburgh. The views which he presents are, therefore, the result of much thoughtful consideration and extended experience.

two has been estimated all the way from nothing to 15 per cent of the cost of the steel. If the additional cost is not over 15 per cent, I believe in three shifts, and trying to pick both bosses and men with more of a spirit of loyalty. Then we can take our furnaces away from the careless type of hunkie—free ourselves from our dependence on the foreigner and make it possible for the American to work through the semi-skilled to skilled jobs. If we do not gain eventually a better type and better loyalty, the company will gain very little from the change, when made.

If we do need eight hours, it is not because the work is too hard, but rather because the time at home is too short, at least for a man giving his whole life to it. Remember, a skilled tradesman cannot change, once he is started. He is always too poor an executive to go up and must fall way back for a job if he cannot retire when he becomes feeble. If we are to consider the work as easy or intermittent, the limiting factor is how long the man has at home and not how long he works. We must make our jobs suitable for the type of man we wish to employ, and to maintain the spirit of good-will which is so essential to continued efficiency.

FERROMANGANESE DRAWBACK

Possibilities of the Steel Export Trade Under the New Tariff

WASHINGTON, Oct. 17.—The high duties carried in the Fordney-McCumber tariff act on manganese ore, ferromanganese and other raw products used by the iron and steel industry have increased interest in the drawback provision of the new measure. This is particularly true of drawbacks in connection with exports of steel in the manufacture of which imported ferromanganese has been used. It is evident that with a duty of 1⅞c. per lb. on ferromanganese, amounting to $33.60 per ton on an 80 per cent content, the drawback becomes an item of importance.

Rebates on Ore and the Alloy

The drawback provision of the Fordney tariff act in all its essential features is similar to that of former tariff laws and provides for a refund to exporters of 99 per cent of the duties paid on imported material used in the manufactured exports. The drawback on each ton of imported ferromanganese used in the exported steel will be $33.26, or 99 per cent of $33.60. Assuming merely for the purpose of calculation that the prewar rate of steel exports continued and that only imported ferromanganese is used in all of this steel, the total annual drawback on the basis of the duty of 1⅞c. would be approximately $700,000. This is arrived at by estimating that one gross ton of steel requires 17 lb. of 80 per cent ferromanganese. In view of the probability that a larger proportion than heretofore of the ferromanganese used at domestic steel works will be made at home under the new tariff, the recoverable duty is likely to be much under the amount stated. Domestic producers of steel for export who make their own ferromanganese would receive as drawback 99 per cent of the duty paid on the ore used in ferromanganese manufacture.

The Tariff Commission has not been approached as yet concerning the drawback that will be allowed on manganese ore and ferromanganese, but the question is being discussed in the trade. There are already large supplies of both in the country, which were delivered before the new tariff law went into effect, and imports since that time have been small. Obviously no drawback will be allowed on present stocks that were imported before the new act became effective because under the Underwood-Simmons act the ore and ferromanganese were on the free list.

Imported Material Must Be Identified

The question has been raised whether a consumer of ferromanganese using both domestic and foreign alloy could secure a drawback on domestic ferromanganese used in exported steel provided a similar quantity of foreign ferromanganese is used as an offset and on this no drawback be claimed.

Section 313, the drawback provision of the Fordney-McCumber act, makes it clear that this cannot be done. The act says:

> When the articles exported are manufactured or produced in part from domestic materials, the imported merchandise shall so appear in the completed articles that the quantity or measure thereof may be ascertained. * * * The imported merchandise used in the manufacture or production of articles entitled to drawback of customs duties when exported shall, in all cases where drawback of duties paid on such merchandise is claimed, be identified, the quantity of such merchandise used or amount of duties paid thereon shall be ascertained, the facts of the manufacture or production of such articles in the United States and their exportation therefrom shall be determined, and the drawback due thereon shall be paid to the manufacturer, producer, or exporter, the agent of either, or to the person to whom such manufacture, producer, exporter, or agent shall in writing order such drawback paid, under such regulations as the Secretary of the Treasury shall prescribe.

It can be appreciated that the difficulties of segregating imported managanese ore or imported ferromanganese and establishing the fact that it entered into certain designated shipments of steel products which were exported may be such in many cases as to make legal proof impossible or at least too costly to warrant the effort to recover the drawback.

Manganese Duties May Be Changed

It is believed that the iron and steel trades will make an effort to have the duties on manganese ore, ferromanganese, ferrosilicon and other products reduced. Application for reductions can be made under the flexible tariff provision, giving power to the President to make reductions or increases not to exceed 50 per cent of the present duties. Should reductions be granted, naturally the drawbacks allowable would be decreased. The drawbacks obviously are only a small portion of the total duties that the industry will have to pay.

The opinion has been expressed that the flexible tariff provisions will be a dead letter and that they were put in the act largely for political purposes. This is quite misleading, for the contrary is true. President Harding himself asked for adoption of flexible provisions which are so marked a departure in tariff making in the United States. He is showing great interest in these provisions, regarding which the Tariff Commission in the near future will promulgate rules and regulations. There can be no doubt that they will be the liveliest features of the act and will be used extensively for the purpose of making investigations through the commission looking to changes in rates and the plan of valuation where economic conditions demand it. While Congress did not appropriate money, an appropriation will be necessary in connection with the investigations the Tariff Commission will make and that will require the trebling of its force of experts. Assurance has been given from a high source that the funds will be forthcoming when they are needed, without the commission having to draw on its regular appropriation.

Vice-Chairman William S. Culbertson of the Tariff Commission, in an address before the American Mining Congress at Cleveland on Oct. 12, discussed plans of the commission for putting into effect the flexible provisions, giving further proof of the purpose of the Administration to make use of them. He outlined the procedure under the provisions calling for the filing of applications with the commission for a change in rates, proceedings before the commission and investigations that will be made by it as provided for by the order of the President on Oct. 7.

The Annealing of Gray Iron Castings*

Correct Time and Temperatures Determined for Relieving Machine and Casting Strains—Effects on Hardness —Increasing Machinability

THE investigation discussed in this paper was conducted by the Allis-Chalmers Mfg. Co., in order to determine the correct time and temperature for annealing gray iron castings, as well as to determine the effect of annealing and quenching on the physical properties. Each set of test bars was cast from the same 3000-lb. ladle, five transverse bars, 1 x 2 x 26 in., being cast in each flask. When breaking several bars at a given temperature only one bar was taken from any one flask. This was done to average the casting conditions.

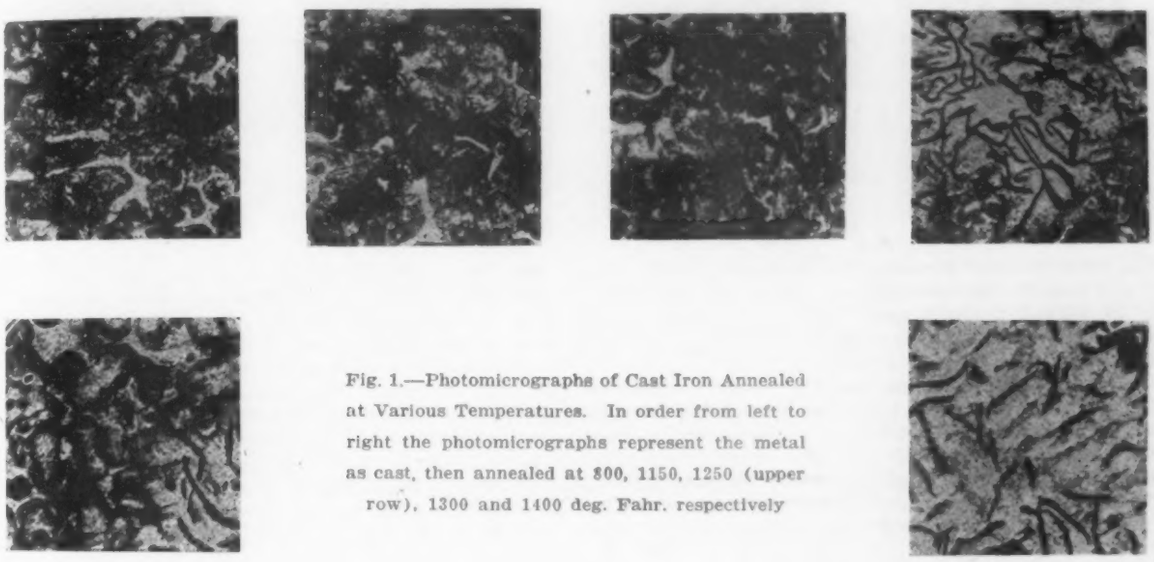


Fig. 1.—Photomicrographs of Cast Iron Annealed at Various Temperatures. In order from left to right the photomicrographs represent the metal as cast, then annealed at 800, 1150, 1250 (upper row), 1300 and 1400 deg. Fahr. respectively

Brinell and scleroscope tests were made on a ground surface of transverse bars near the fracture or on a ground surface of the threaded end of the test bar when only tensile bars were broken. The transverse bars were 1 x 2 in. and 24 in. between centers, and were broken on a standard Riehle-type transverse testing machine. The tensile bars were cut from transverse bars after fracture, and were taken longitudinally, and adjacent to the fracture. The tensile bars were made with threaded ends, and were ground to 0.564 in. for a space of 2 in. in the center of bar.

The furnace used for heating was of the semi-muffle oil-fired type and was equipped with a Leeds & Northrup-type potentiometer pyrometer system. For annealing purposes test bars were held at the maximum temperature for one hour, and cooled in the furnace. The combined carbon was determined by color and only used as a check. All specimens for photomicrographs were etched with picric acid.

The results of annealing for one hour on the first set of bars indicate that up to 1150 deg. Fahr. there

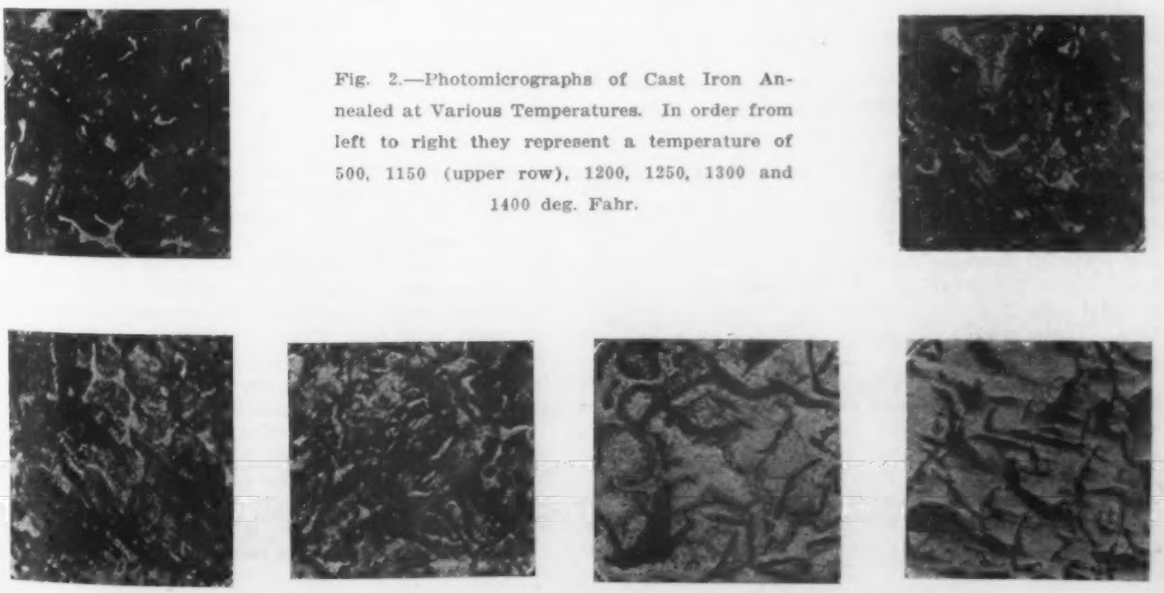


Fig. 2.—Photomicrographs of Cast Iron Annealed at Various Temperatures. In order from left to right they represent a temperature of 500, 1150 (upper row), 1200, 1250, 1300 and 1400 deg. Fahr.

*From a paper, "Annealing Gray Cast Iron," presented at the 1922 convention of the American Foundrymen's Association in Rochester, N. Y., June 26 to 29. The authors, J. F. Harper and R. S. MacPherran, are connected with the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

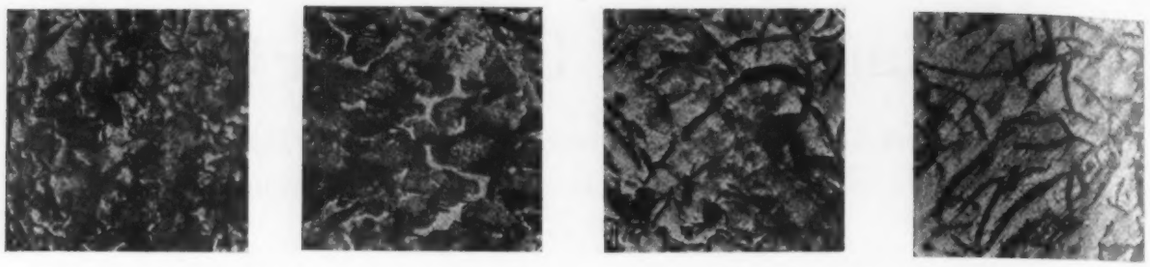
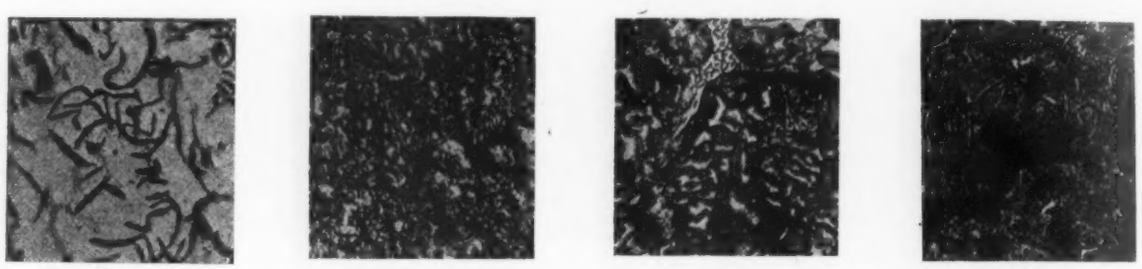


Fig. 3.—Photomicrographs of Cast Iron Annealed at Various Temperatures. In order from left to right they represent a temperature of 500, 1200, 1250, 1300 (upper row), 1400, 1500, 1500 and 1600 (lower row)



has been no loss of strength. Apparently there is a slight drop in the scleroscope hardness, but no change in the Brinell hardness until 1200 deg. Fahr. is passed. These results are confirmed by the change in combined carbon.

Representative photomicrographs were taken from these bars as indicated by group letter, flask number and temperature of annealing, given under each. These are shown in Fig. 1. No decided change had taken place until temperature of 1250 deg. Fahr. was reached. (Bar K-2.) This change is progressive as temperature increases until at 1500 deg. Fahr. it is practically complete. There also appeared to be a tendency of the graphite flakes to enlarge.

The results of annealing for a period of one hour would indicate no loss of strength at 1150 deg. Fahr. nor material decrease in Brinell and scleroscope hardness at this temperature. At 1250 deg. Fahr. there is a slight drop in physical properties, as well as in hardness. These results are again confirmed by a decrease in combined carbon.

Representative micrographs were taken from these bars as above described, and are shown in Fig. 2. There will be noted a very slight change at 1200 deg. Fahr., followed by a decided change at 1300 deg. This is again progressive, and at 1400 deg. is practically complete.

To determine the element of length of time of annealing, the tests were made as shown in Fig. 4. From other data it would appear that the temperature of 1150 deg. Fahr. (for one hour) should not be exceeded when annealing to relieve machine or casting strains. In Fig. 4 is clearly shown the effect of continued annealing at this temperature. It will be noted that there is a material loss of hardness and strength on the longer periods of time at this temperature. The effect of annealing at 1050 deg. Fahr. for various periods of time indicates that this temperature of annealing for reasonable periods does not tend to decrease materially the hardness or strength.

When annealing to increase machinability, only temperatures of from 1450 to 1550 deg. Fahr. will be found satisfactory. In this case, however, the drop in hardness is accompanied by a decided loss of strength.

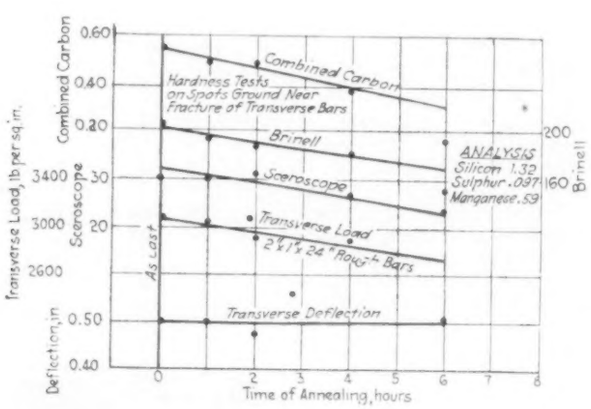


Fig. 4.—Effect of Time of Annealing on Properties of Cast Iron

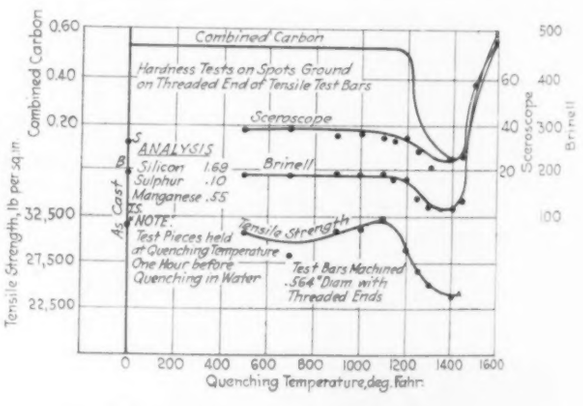


Fig. 5.—Effect of Quenching Temperatures on Properties of Cast Iron

The following experiments were made on the effect on cast iron of quenching at various temperatures. In the case of bars held at the quenching temperature for one hour before quenching in water, it should be noted that above 1200 deg. Fahr. the Brinell hardness falls off until 1400 deg. Fahr. is reached, above which it rises very rapidly. The fall in scleroscope hardness is less abrupt, but both in decline and increase follows the Brinell test. The tensile strength falls off above 1150 deg. progressively until 1400 deg. is reached. When quenched above this temperature the bars were too hard to machine. The combined carbon begins to diminish at 1200 deg. which change continues progressively until over 1400 deg., when it again rises rapidly.

In Fig. 5 the test bars were cut from broken trans-

verse bars and were quenched in water after holding at quenching temperature one hour. Above 1200 deg. Fahr. the Brinell hardness falls off until 1400 deg. Fahr. is reached. Above which it increases rapidly. The change in scleroscope hardness again follows the Brinell test. The tensile strength begins to show a decrease at 1200 deg. which continues until 1400 deg. is reached. When quenched above this temperature the bars become unmachineable. The combined carbon seems to confirm the above tests.

The photomicrographs in Fig. 3 show a breaking up of the carbides at temperatures above 1200 deg. Fahr. which change is practically complete at 1400 deg. Fahr. When quenched above this temperature the carbon is partly retained in solution with resulting increase in hardness. An interesting comparison is shown between photomicrographs in Fig. 2 and those of Fig. 3.

From the results of these tests it would seem that until the temperature exceeds the critical the rate of cooling has no effect on the physical properties of cast iron.

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Talbot and Other Open-Hearth Processes Compared

Original German Investigations of 1914 Continued to Date—Some Former Conclusions Modified

A DETAILED comparison of the Talbot with other open-hearth furnaces, both fixed and tilting, was published in *Stahl und Eisen* early this year. The author is Dr. J. Puppe and the article in several installments is a continuation of the paper published by Schuster* in 1914 (*Stahl und Eisen*, June 4, 11 and 18, 1914), detailing the results obtained from 1912 to that date.

In conjunction with his results on the furnace operations, Doctor Puppe also describes the results obtained with the gas producer and mixer plant at Witkowitz. The furnaces comprise three open-hearth furnaces of 50 to 60 tons capacity, a 65-ton Wellman furnace, and three 200-ton Talbot furnaces, two of the latter having been installed in 1915-16 with certain modifications which the writer describes.

In view of the fact that it would be unsatisfactory to publish some of the tables and omit others, the writer's conclusions regarding the advantages of the Talbot process as compared with the others in use follow:

Dr. Schuster, in the article mentioned, stated that:

1.—"By using a mixer to which heat can be applied, the production of steel in the furnaces supplied by this mixer can be increased by about 30 per cent, with a reduction in the time of operation."

In regard to this, the present writer confirms that the increase of output in steel furnaces running in conjunction with a mixer is from 10 to 20 per cent. This divergence from the opinion of Dr. Schuster is due to the fact that the pig iron worked up during the present period contains 1.7 per cent phosphorus, and that the work done by the mixer is less than during the years 1913-14.

2.—"The quantity of steel produced is, as regards physical and chemical properties, independent of the type of furnace selected." This is entirely confirmed by the experience gained from 1914 to the present time.

3.—"The quantity produced is governed, first, by the pig iron used, and second, by the proportion of scrap to mixer iron or pig, being practically the same in furnaces of different types where these particular conditions remain unaltered." The further experience confirms this statement.

4.—"The Talbot furnace is the most adaptable type for working up pig iron of different composition and as regards varying the amount of scrap added within fairly wide limits." As regards the first part of this statement, viz., that the Talbot furnace is the most suitable for treating pig iron of varying composition, the experience since gained confirms this opinion. The large residue in the bath partially compensates for the fluctuations in chemical composition occurring in the mixer iron, and the high temperature of the residual bath accelerates the oxidation of the admixtures. As regards the second part of the statement, the present writer's experience does not coincide with it, for open-hearth furnaces have been found to be the most adaptable in this particular respect, in that production was the least impaired in this type of furnace with increase in the percentage of added scrap.

5.—"In the Talbot furnace, it is possible to treat pig iron having the lowest to practically the highest phosphorus content without impairing the quality of the steel, the residue with high-phosphorus pig iron being smaller than with other types of furnace." The present writer remarks that the residue when using high phosphorus pig iron in the Talbot furnace is less than in other types, because the phosphorus is more rapidly oxidized in the Talbot furnace. The advantage of the Talbot furnace of treating high phosphorus pig without any detrimental effect on the steel is a quality possessed by any tilting furnace, because the phosphorus-rich slag can be removed by tilting.

6.—"Although the absolute first cost of the Talbot furnace is considerably higher than for tilting furnaces of smaller capacity and fixed open-hearth furnaces, when referred to the ton of steel produced, they work out more favorably for the Talbot." The figures given in the present paper for the production in open-hearth Wellman and Talbot furnaces confirm the above statement.

7.—"The yield of metallic iron from the oxidized materials added (ore and mill scale) is higher in the Talbot than in the other furnaces." The present writer is unable, in the absence of definite figures, to confirm this statement. He expresses the view, however, that the yield of metallic iron from the oxidized added materials may be the same in all three types of furnace, granted the same conditions.

8.—"The slag produced in the Talbot furnace is more valuable than that obtained in other types of furnace, when high-phosphorus pig is used, owing to the concentration of the phosphoric acid. Hence the amount obtained for the sale of the slag is higher." The present writer confirms this statement. The consumption of refractory bricks and dolomite is lowest in the Talbot furnace, as is also the slag formed from the furnace lining. The adhesion of slag in the Talbot furnace is therefore slightly less than in other furnaces, and the phosphoric acid content higher.

9.—"The fuel consumption in the Talbot furnace is lower than in the other furnaces." This fact is con-

*Published practically in full in THE IRON AGE, May 21, 1914. Discussion in THE IRON AGE, Nov. 12, 1914. This abstract is from the *Iron and Coal Trades Review*, Aug. 4, 1922.

firmed by later experience and by the heat balances now published.

10.—"The durability of the refractory lining is much better in the Talbot than it is in the other furnaces; hence the charges for repairs and the total consumption of refractory materials in the furnace operations are lower." Experience confirms this statement.

11.—"The operations of the Talbot furnace are very simple and convenient, due to the ease with which the slag may be removed by tipping the furnace." This advantage over ordinary fixed open-hearth furnaces is possessed by the Wellman as well as by the Talbot furnace.

12.—"The work of the furnacemen is less strenuous with the Talbot than it is with any of the other furnaces; while the Talbot also requires a smaller number of men carrying out the several operations." The above statement is quite correct, due to the elimination of hearth repairs and to the large production of the Talbot furnace. Continuing, the present writer states that the essential advantages of the Talbot process as compared with the other processes carried out at his works, viz., higher daily production, larger number of heats without relining, and lower costs for fuel, refractory bricks, ferromanganese, repairs and wages, are fully confirmed by the figures obtained from 1914 to the present date. All these advantages find expression, of course, in the ratios of costs of production. Doctor Schuster in 1914 placed the ratio as 100 for the Talbot, 105 for the Wellman, and 107 for the fixed furnace. The present writer found these ratios to hold good and even to be exceeded in some years in favor of the Talbot furnace, the ratios in 1915-16 being 100, 110, and 117 respectively.

It is only during the tremendous increases in the cost of pig iron and the drop in the prices of scrap in the last few years that this ratio has come out to the disadvantage of the Talbot furnace. The difference between the prices for scrap and pig iron was so considerable that all the advantages of the Talbot furnace could not keep up with it, and the material from the fixed and tilting furnaces worked out cheaper. It is only recently, since the provision of very large quantities of scrap became possible, that the writer's works have used larger quantities of scrap in the Talbot furnaces, the quantities of charge recently having been about 70 per cent of scrap and 30 per cent of solid pig containing 1.6 per cent phosphorus. Working in this way, they have obtained in the Talbot furnaces, using very light scrap and taking a longer time for charging, about 3.2 to 3.6 heats compared with 2.4 to 2.8 heats in the other types of furnace. The costs of production under these circumstances again show the pronounced superiority of the Talbot over the other furnaces.

The article contains tables referring to: Analyses of producer coal; analyses of producer gas; consumption of coke-oven gas which is used along with producer gas in the furnaces, as well as in the mixers; quantities of material treated in the mixer; charges, outputs and efficiency figures for the mixer; analyses of pig iron, mixer iron and mixer slag; production and life of the three types of furnace used; consumption of refractories; time taken in repairs and re-linings; consumption of dolomite; average analyses for the three types of furnace; analyses of different products; material composing the charges of the different furnaces in the several years under review; production figures for the various furnaces from 1912-13 to 1920; and heat balance for the three types of furnace. Curves are given showing gas and waste-gas temperatures; the combustion of heats in an open-hearth, a Wellman, and a Talbot furnace; and the heat balance for the three types.

MORE ACTIVE CAPACITY

Car Supply Improves in the Valleys, But Accumulations Still Large

YOUNGSTOWN, Oct. 17.—Some easing in the stress of car shortage is reported by traffic officials of Valley steel properties, enabling the shipment of outbound products in a more satisfactory degree. Indicating improvement in the transportation situation is the additional number of blast furnaces being charged. The sheet department at Niles of the Republic Iron & Steel Co., which was reduced to a 50 per cent operating basis for two weeks on account of accumulation of material, has again been restored to normal.

Still, at the week's beginning, it was estimated fully 60,000 tons of products were piled in the two Valleys. Lifting by the Pennsylvania Railroad of embargoes on shipments westbound from Youngstown helped the situation to an appreciable degree, as the road furnishes an important outlet for the district's products. Considerable steel moves west from this territory. Traffic departments report that while transportation shows moderate betterment, there is still much congestion, and the shortage of mill type gondolas and box cars continues a retardant.

Operations, however, are on the ascendant and some interests are producing at a rate close to their normal output. In September, for instance, the 12-unit open-hearth department of the Brier Hill Steel Co. produced 68,197 tons of ingots, establishing a new monthly record. October production is at a rate which may exceed that of September.

Owing to the resumption of blast furnaces at Farrell, Pa., of the Carnegie Steel Co., the number of active stacks in the district has been increased to 29, of 47. The active furnaces represent about 75 per cent of total capacity. Other district stacks will be blown in at an early date.

Indicating the high operating rate of steel departments is the fact that all three Bessemer converters are blowing, while 59 of 66 open-hearth furnaces are charged, including 46 of 51 independent units. Sheet mills are scheduled at a normal rate.

It is unlikely, according to present conditions, that the mechanical puddling plant being constructed at Warren by the Youngstown Steel Co. will be completed before next summer.

The Federal Steel Foundry Co., foot of Reaney Street, Chester, Pa., has resumed production at its open-hearth steel casting plant, following an extended curtailment, and will gradually advance operations until a full working force on full-time is reached. It is expected that this will be within four or five weeks. The Delaware River Steel Co., in the same city, is arranging for the re-opening of its plant, which has been closed since December, 1920; production will resume early in November, and it is planned to give employment to the normal force of 350 men closely following.

The Midwest Castings Co., Middletown, Ohio, resumed operation Oct. 16, after 14 months of inactivity. Orders covering a considerable tonnage have already been booked, and Harry S. Wise, secretary-treasurer, predicts full operation within four or five weeks. H. W. Needham, who has been for many years associated with the Muncie Malleable Foundry Co., Muncie, Ind., will be superintendent, and Moren Whitlinger will act as his assistant and also as metallurgist.

The National Enameling & Stamping Co. has adopted a capacity schedule at its Granite City, Ill., plant for the first time in a number of months. During the summer the plant operated on a considerably curtailed basis.

In connection with the estimation of porosity of blast furnace coke, methods for determining true and apparent specific gravity of coke are being investigated at the Pittsburgh experiment station of the Bureau of Mines. This work is being carried on in co-operation with committee D-6, on coke, American Society for Testing Materials.

MILL TO ROLL MONEL METAL*

Electric Motor Drives for International Nickel Co. Huntington Works

BY F. C. WATSON†

THE Huntington works of the International Nickel Co. are located in close proximity to valuable natural resources, among which are natural gas, fuel oil, and high-grade bituminous coal. In addition, transportation facilities are excellent. Construction was commenced in March, 1921, and operating was started in June, 1922.

The works contain all of the necessary facilities for the conversion of monel metal matte into monel metal sheets, bars, rods and wire rod in various forms, and pig metal, shot and ingot in cast forms; also forgings. The buildings include the calciner, refinery, hammer shop, chipping shop, merchant mill, warehouse and sheet mill. There is also a well-equipped chemical and physical laboratory and general office directly in front of the sheet mill.

Ore from which monel metal is produced is obtained from mines of the company, located near Sudbury, Ontario, and with roasting and smelting at the company's smelter is converted into monel metal matte and shipped to Huntington. The matte is then crushed, ground and roasted in large furnaces in the calciner department, after which it is taken to the refinery to be charged into open-hearth furnaces and is cast into pig for further melting in electric furnaces for the production of ingots.

These ingots are sent to the chipping shop, where the scale and surface are removed by milling machines and any remaining imperfections are removed by pneumatic chipping, after which they pass to the hammer shop, where 5 and 8-ton steam hammers forge them into billets 8½ in. x 5 in. and 8 in. x 8 in. x 5 ft. The billets are again chipped to remove any imperfections and then sent to the merchant mill furnaces and heated for the 24-in. bar mill, from which sheet bars and merchant mill sizes are produced.

Monel metal is an alloy of nickel and copper containing about 67 per cent nickel, 28 per cent of copper and 5 per cent of other elements. This remaining 5 per cent consists partly of iron from the original ore and partly of manganese, silicon and carbon, introduced in the process of refining.

Power is purchased from the Consolidated Light, Heat & Power Co. of Huntington, with a generating capacity of about 20,000 kw. at the local station and an arrangement for purchase of further power from the Virginian Power Co., whose station of 65,000 kw. is located at Cabin Creek, about 65 miles from Huntington. The latter company supply is from a transmission line on steel towers at 44,000 volts, but is designed to deliver power eventually at 88,000 volts.

In addition to the purchased power, there is a small power plant located near the refinery, where waste heat from the open-hearth furnaces is utilized under two 600-hp. Babcock & Wilcox special type Rust boilers, with superheaters. The boilers are equipped to burn natural gas as an auxiliary fuel. Six drums are used on each boiler.

Equipment in the power house consists of two 750-kw., 2200-volt, 3-phase, 60-cycle Westinghouse turbo-generators. The turbines are equipped with LeBlanc condensers, discharging into a cooling pond. The switchboard consists of Westinghouse generator panels, exciter panel, and line panel, with oil circuit breaker so interlocked with the oil circuit breaker in the substation that the latter must be closed before the breaker on the line panel in the power house can be closed. Steam from two 300-hp. boilers in the hammer shop is also available for use in the power house.

Electric Furnaces

In the refinery are two electric furnaces and two open-hearth furnaces. From the latter monel pig is produced for use in the electric furnaces. Both electric furnaces are arranged with a charging floor about 12 ft. above the main floor and all of the 2200-volt transformers and switching equipment is located under this.

There are one 7-ton Heroult furnace and one 3-ton Moore 'Lectromelt furnace. These furnaces have been in successful operation with good results, both having a power factor averaging 0.90. The furnaces are charged with cold metal. The power consumption varies from 642 kwhr. to 714 kwhr. per ton of melter metal.

Mill Motors and Controls

The following mills are equipped with 2200-volt, 3-phase, 60-cycle, wound rotor induction motors:

Mill	Driven by Motor of	R.p.m.	Motor Make
24-in. merchant	1,200 hp.	360	Allis-Chalmers
20-in. merchant	1,000 hp.	450	Allis-Chalmers
14-in. merchant	800 hp.	450	Allis-Chalmers
9-in. wire rod (fin.)	500 hp.	450	Allis-Chalmers
14-in. Belgian (rough)	500 hp.	450	Allis-Chalmers
30-in. sheet (hot)	1,200 hp.	360	Allis-Chalmers
26-in. sheet (cold)	300 hp.	300	Allis-Chalmers
10-in. merchant	500 hp.	865/575	Westinghouse
9-in. wire rod	500 hp.	865/575	Westinghouse

The 24-in. merchant mill has two stands; one three-high stand, with 24 in. x 70 in. rolls, and one two-high stand, with 24½ in. x 24 in. rolls. The mill is equipped with electrically operated stationary and tilting tables, manipulator, bloom shear and hot saw and is used for production of sheet bars, bars and billets of various sizes. The 1200-hp. motor driving this mill is direct connected by flexible coupling to the pinion shaft of a herringbone single reduction gear set, giving a mill speed of 80 r.p.m. On the pinion shaft of the gear set are mounted two fly-wheels, each weighing 10 tons.

The 20-in. merchant mill has five stands; four three-high, and one two-high. This mill will roll rounds 2 in. to 4 in., squares 2 in. to 4 in., flats 4 in. x 1 in. to 8 in. x 2 in. width round and square edges; also billets 2 in. to 4 in. square. The 1000-hp. motor driving this mill is direct connected through flexible coupling to the pinion shaft of a single reduction herringbone gear set. Two 6-ton fly wheels are mounted on the pinion shaft of gear set. The mill has a speed of 60 r.p.m.

The 14-in. merchant mill has four three-high and one two-high stands. This mill runs at 100 r.p.m. and will roll rounds, squares and hexagons 1 in. to 2 in. and flats 2 in. x ¼ in. to 4 in. x 1 in. The 800-hp. motor driving this mill is direct connected through flexible coupling to an 8½-ton flywheel located between the motor and the pinion shaft of a single reduction herringbone gear set.

The 14-in. Belgian roughing mill has two three-high stands and one two-high stand. The 500-hp. motor driving this mill is direct connected through a flexible coupling to an 8-ton flywheel. The shaft of the flywheel is coupled to the pinion shaft of a single reduction herringbone gear set. Speed of mill is 160 r.p.m.

The 10-in. merchant mill has four three-high and one two-high stands, rolling rounds, squares, hexagons and octagons 7/16 in. to 1 in. and flats 1/16 in. x ¾ in. to 1 in. x ¾ in. This mill is driven by a variable speed motor with a 3-ton flywheel interposed between the motor and a single reduction herringbone gear set having a reduction of 5 to 1.

One 9-in. wire rod mill has five three-high stands. The 500-hp. variable speed motor is direct connected through a flexible coupling to the pinion shaft of a single reduction herringbone gear set. The main shaft of the gear set is connected to a single flywheel set whose shaft is connected to the mill. The gear reduction has a ratio of 2.25 to 1.

The 9-in. finishing wire rod mill has four three-high stands, direct connected through flexible coupling to a 500-hp. motor running at 450 r.p.m. The two mills roll 7/32 in. to ⅜ in. rod and are equipped with motor driven reels.

The 30-in. sheet mill with 30 in. x 56 in. rolls has two roughing and two finishing stands. The 1200-hp. motor is connected by flexible coupling to the high speed pinion shaft of a double reduction herringbone gear set, giving the mill a speed of 26 r.p.m. The high speed shaft carries two 10-ton flywheels. The gear set has

*Abstract of a paper presented at the sixteenth annual convention, Association of Iron and Steel Electrical Engineers, Cleveland.

†Electrical superintendent International Nickel Co., Huntington, W. Va.

provision for driving two more roughing and finishing stands at some future time. The roughing stand screw downs are equipped with 40-hp. General Electric, compound wound motors, provided with Cutler-Hammer brakes.

The 26-in cold mill has four stands with rolls 26 in. x 56 in. The 300-hp. motor is connected by flexible coupling to the pinion shaft of a single reduction herringbone gear set. The mill speed is about 29 r.p.m.

All gear sets were furnished by the Mesta Machine Co. and all flexible couplings by the Allis-Chalmers Manufacturing Co. The Westinghouse adjustable speed sets driving two of the mills develop constant horsepower at all speeds between 575 and 865 r.p.m., the synchronous speed being 720 r.p.m. The motors are standard wound rotor induction motors.

PRICE TREND DOWNWARD

Lower Quotations in Coal and Coke in the Valleys—Concessions in Sheets

YOUNGSTOWN, Oct. 17.—Reduction of iron costs may be expected to exert an important influence on steel prices, and in consequence the price situation is characterized as softer. In the Valleys, the market on basic pig iron is now regarded as from $30 to $31. Decline in costs of such raw products as coal and coke is having an appreciable effect on the market. Old material, though still high, will recede, buyers predict, as soon as transportation conditions show greater improvement and the railroads begin to deliver scrap in more normal volume. Wthin the past three weeks congestion and car shortage have interfered with deliveries and offerings, enabling dealers to uphold the market.

Industrial coal prices have perceptibly softened the past two weeks. Because of the jam at lake ports of coal destined for the Northwest, large consignments have been thrown upon the market, and buyers have taken advantage of this situation to cut into prices. Gas coal, purchased in large tonnages for by-product coke oven uses, is obtainable at a $4.50 maximum; run-of-mine coking coal is quoted at $4, while steam coal may be bought at $3.25 to $3.50. These prices represent recessions ranging from 50c. to $1 per ton below the recent nominal market.

Coke Prices Sag

Because of the larger production of coke in both beehive and by-product ovens, prices are sagging, and industrial buyers say that $11 to $11.50 at the ovens is a fair appraisal of the market at this time. Until recently, prices from $12.50 to $13 were being paid, while sizable tonnages were taken at $12. A Valley independent is selling considerable merchant coke and is particularly active in the market at present, because of the margin of profit. It is supplying domestic interests in Illinois, Michigan and Indiana in carload lots, and is also selling an iron maker at Erie, Pa., part of its requirements.

Another independent is supplying its employees with coke at $4.75 per ton delivered. It is explained, however, that this is simply an expedient to aid its workers in obtaining a fuel supply because of the comparatively high prices being charged for retail coal.

Activity is noted in the tin plate market on the part of consumers covered by contracts, who are specifying with more freedom at current quotations. Such buying interests are covering on their requirements in order to benefit from their price arrangements with the mills. Requirements of the oil industry for cans are reflected to a considerable extent in this activity, according to the Trumbull Steel Co. The $4.75 price is being maintained, while preferential customers are enjoying concessions.

Sheet Prices Not So Strong

Sheet makers are well fortified with respect to unfilled commitments, but an unmistakable price weakening is developing. Outside quotations of 3.75c. for black and 4.75c. for galvanized grades are disappearing, even as a trading basis, and are being superseded by prices $3 per ton less. Irregularity of the market and variation in demand are responsible for this weakness. While 3.60c. and 4.60c. are representative of the market position of some interests, others are showing interest in business at $2 per ton less. The bulk of the tonnage going through the rolls was undoubtedly booked at 3.50c. and 4.50c. or less.

A trip through Valley plants indicates that most of them are still impeded by accumulations. Less progress has been made in enlarging the box car supply than in open top equipment, with the result that sheet mills are pretty well clogged. Where the haul is short, trucks are being used, while tops are also being rigged on mill gondolas and the product covered with tarpaulins in transit, to protect it from the elements.

Sheet mills generally have enough business to carry them over the rest of the year, while bookings of two interests will engage their capacity into the first quarter of 1923. The chief independent maker of full finished stock is sold through 1922 and is practically out of the market, 90 per cent of the output being taken by automobile buyers.

Minimum Prices Disappear

Steel bars and plates are weaker. In plates, 2.25c. represents the outside of the market, and is obtainable only because there is active bidding for deliveries on the part of a number of tank car builders. One interest, withdrawn from the market on merchant plates, is placing tonnages with producers in position to meet delivery requirements.

Merchant bars range from 2c. to 2.15c., and the 2.25c. quotation has disappeared. District interests have comfortable backlogs, but are reducing such commitments.

Because of the congested condition of the railroads, scrap is somewhat higher here than in nearby consuming districts. Heavy melting is held at $22, while compressed sheets command $20 to $20.50. One large independent is now producing much of its own scrap, because of its heavy finishing mill production.

Business Men Confer with Ordnance Officials

WASHINGTON, Oct. 17.—With the object of having munition plants of the country repaired for quantity production, without confusion, and to set up a permanent and inexpensive system to meet any emergency that may arise, eight dollar-a-year business men enrolled in the Government service, were in a conference in Washington recently with Army ordnance officials. Those attending this conference on the mobilization of ordnance manufacturing plants consisted of a group of the civilian chiefs of eight ordnance districts into which the country has been divided. Those present at the conference were B. A. Franklin, chief of the Bridgeport, Conn., district; J. C. Jones, chief of the Philadelphia district; Fred J. Robinson, chief of the Detroit district; M. E. Singleton, chief of the St. Louis district; C. L. Harrison, chief of the Cincinnati district; John Ross Delafield, chief of the New York district; E. A. Russell, chief of the Chicago district, and C. H. Tenney, chief of the Boston district.

It is the theory of the Ordnance Department in setting up these districts, each in charge of a civilian chief, all available plants will be under the jurisdiction of the district chief who will be in constant touch with manufacturers and can arrange an agreement with them for the prompt use of the plants in the event of war. Each chief is himself a manufacturer and is experienced in the production of war munitions. To each of them has been assigned an army ordnance officer as secretary to aid in carrying out the program.

Pit Reheating and Soaking Pit Furnaces*

Removal of Waste Gas a Primary Consideration Rarely Achieved—Principles Governing Rational Design

BY W.-E. GROUME-GRJIMAILO

WITH pit reheating furnaces the defect commonly encountered consists in the incorrect taking off of the waste gases. In these furnaces, by reason of the considerable height of the heating chamber, it is absolutely necessary that the waste gases should be drawn off as close as possible to the level

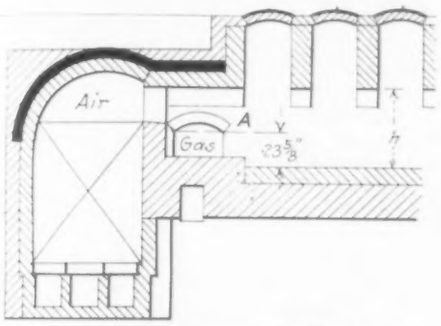

Fig. 1 Shows an Expensive Design of Furnace in Which a Pocket of Stagnant, Chilled Gases Must Collect Below *A*; Reconstruction Did Not Overcome the Trouble

of the hearth of the pit; since, if they are not constructed in this manner, the lower portion of the ingots are plunged into a pocket of stagnant gases and therefore will not be heated uniformly, the tops being much hotter than the bottoms.

Among the designs for these furnaces which have come before the author, there have been none which were completely satisfactory; and in a number of them there were gross violations of the laws governing the removal of the waste gases. Fig. 1, shows the flues

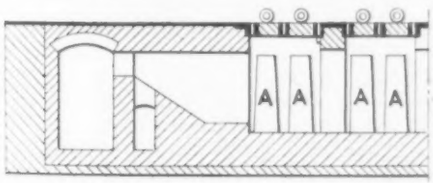

Fig. 2 Is an Example of Poor Design in that the Gases, Taken off at Top, Leave the Ingot Bottoms Cold. Ingots are shown at *A A*

and ports of a pit furnace of "the new Siemens system" of a very expensive design. These pits were supplied with regenerators for the air only, the gas regenerators being omitted. Therefore the products of combustion cannot pass out of the "laboratory" without going through the air regenerators, which are carried up behind a bridge wall to a height of 2 ft. (600 min.) above the hearth of the pits (refer to the point marked *A*).

It is clear that upon the hearth of these pits there will be a pocket of stagnant, chilled gases. Nothing can be done to save this furnace and make it work properly and heat uniformly. Lowering the partition arches between the pits in such a manner that the height *h* under them was equal to the depth of the layer of gas below the inverted weir, according to the formula of Yesmann, was tried. Reconstructed in this manner the pits worked, but the velocity of the gases within the heating chamber was equal to the normal velocity under the inverted weir; that is to say, with the height $h = 3$ ft. 3⅝ in. (1 meter) (3.28 ft.), the velocity $v = 19$ ft. 8 in. (6 meters) per sec. A velocity as high as this is very unsatisfactory, as the heat from the gases and flame does not have a sufficient amount of time to be transmitted to the ingots, and for this reason the consumption of fuel will be unreasonably high. The best means of reconstructing this pit furnace consists in removing the bridge wall in front of the regenerator so that this port extends down to the hearth of the pits.

Fig. 2 shows a regeneratively fired pit furnace constructed according to the designs of Dalen† at the

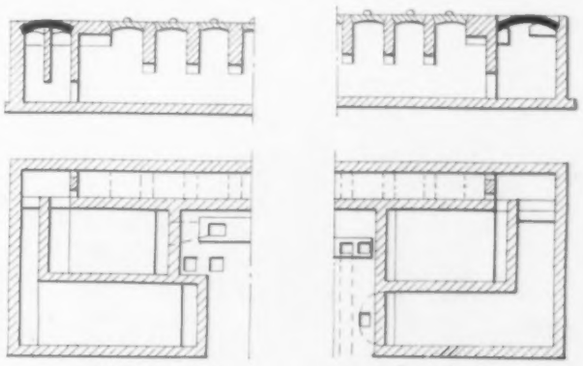

Fig. 3 Fig. 4

Figs. 3 and 4 Are Two Examples of Heads for Mixing the Gas Properly with the Air

Salda works (Oural district of Russia). The waste gases are taken off at the top of the pit. By reason of this the lower portion of the ingots was not in contact with the hot gases. In reality, during the time these pits were in service, the lower portion of the ingots was always heated less than the upper portion. This made it necessary to charge the end pits with the ingots leaning up against the walls (thick end down). To improve the working of the furnace it was found necessary to cut away the sloping portion of the port nearly to the level of the hearth of the furnace.

As the regenerative pit furnace is a very desirable and widely used furnace, the principles governing their rational construction may be stated as follows:

It is desirable that the heating chambers of these pits be operated with a slightly negative pressure, in order that the operatives will not be burned when taking the covers off the pits;

The arches over the regenerator chambers should be as nearly as possible at the level of the covers, as this simplifies the matter of covering the entire furnace with iron plates, forming a working platform;

It is convenient to make the regenerators horizontal and construct them in such a manner that the waste gases enter the upper portion and pass out from the lower portion, to enter the flues leading to the reversing valves;

The port sills should be placed as close as possible to the hearth of the pits. If this construction is employed it will not be necessary to carry the partition walls between the pits down close to the hearth, and the hot gases will have a low velocity through the heating chamber;

The dimensions of the ports should be calculated by means of the formula for the inverted weir, as this

*From "The Flow of Gases in Furnaces," to be published by Wiley & Co.; translated and copyrighted by A. D. Williams, P. O. Box 92, Newark, N. J.

†A well-known German designer of furnaces.

gives the minimum velocity for the flow of the gas and the air through the ports, and accordingly a slow rate of flow for the hot gases through the heating chamber of the pits;

For effecting the mixture of the gas and the air, the heads shown in Figs. 3 and 4 may be employed. The differences between these two constructions are clearly shown in the drawings.

Automatic Drill Head for Small Work

A new automatic drill head, with which special semi-automatic machines such as illustrated may be built, to give large production on small work, has been placed on the market by the Kingsbury Mfg. Co., Keene, N. H.

As an example of its adaptability it is said that to drill six or eight oil holes in a piston simultaneously, the required number of drill heads may be placed in a circle, properly spaced, and a ¼-hp. motor belted to each. Then by connecting all the trip levers to one foot pedal the operator can release all the spindle feeding mechanisms with one motion as soon as the work is in position. The machine shown is equipped with a single spindle unit for cross drilling chuck wrenches, a special fixture with automatically controlled opposed spindle being provided for removing the burr left by the drill. Four of these units may be mounted on the table.

The drill head shown in the insert is the No. 8, with a capacity of No. 60 to ¼-in. drills, and has a self-contained full-automatic feed and control. Although designed for use in a horizontal position, it can be

Machine for Cross Drilling and Burring Chuck Wrenches. An enlarged view of the drill head with self-contained full automatic feed and control is shown in the insert

mounted on an angle or vertically. Each spindle may be driven from an individual motor and obtaining the drive regardless of the position of the head is thereby simplified. With a view to making the head as frictionless and sensitive as possible seven ball bearings are employed, and two provided on the quill feed shaft.

A feature is the pressure feed system, which is claimed to eliminate drill breakage even with very small drills. The automatic sensitive feed is obtained through the combination of a cam with friction gears. The driven gear is mounted on a lever and held in mesh with the friction driving roll or gear by an adjustable compression spring. The cam is cut on the inside of the driven gear and the follower roller is mounted on a gear segment, which meshes with a gear segment clamped to the feed shaft. The compression spring applies pressure to the drill spindle through the cam to the follower; thence through the gear segments to the feed shaft and quill. The cam is revolved by the friction gears and feeds the spindle forward under pressure.

When the forward motion is resisted the follower roller is held momentarily and the rotation of the gears causes the cam to climb on the roller, separating the friction gears and allowing them to slip. As the drill penetrates the work under pressure the follower gives way, bringing the friction gears into tight contact and causing the cam to revolve and again separate the friction gears when further resistance is met. This intermittent motion is not perceptible, it is said, as the action is rapid and smooth.

The cam gives a 1-in. stroke to the spindle with a maximum feed of 0.011 in. per revolution. Special cams can be used with one or two reliefs which will permit of withdrawing the drill during operation, to relieve the chips. For operating indexing and other automatic fixtures a cam may be cut on the outside of the friction wheel or gear.

The diameter of the spindle is 7/16 in., the spindle travel, 3 in. and the spindle adjustment, 2 in. Speeds up to 4000 r.p.m. can be given to the spindle and the maximum speed of the cam is at the rate of 1/115th of the spindle speed. The height to the spindle is 6.75 in., the height overall being 9½ in. and the overall length to nose of chuck in back position, 14 in. The width is 7 in. and the weight of the machine 50 lb. net. Floor stands, lubricating systems and other equipment for use with the machine are available.

Production Features Automotive Meeting

Devoted exclusively to papers and visits of interest to production men, the Oct. 26 and 27 meeting in Detroit of the Society of Automotive Engineers is expected to attract factory managers, superintendents, efficiency men, tool builders and production engineers from the entire automotive industry. The two morning sessions will be held in the General Motors Building, from 9.30 to 1 o'clock, followed in each case by luncheon in the same building. Factory visits will follow. Thursday's visit is to be devoted to the Ford Motor Co., River Rouge plant, and Friday afternoon's to the Dodge Brothers, Packard and Cadillac plants. A dinner Thursday evening will be addressed by A. B. C. Hardy, president Olds Motor Works, and Pierre Dupont, president General Motors Corporation. Harold Emmons will be toastmaster.

Papers so far announced are as follows:

"The Group-Bonus and Its Application," by E. K. Wennerlund.
"Cylinders, from the Ore to Finished Part," by P. E. Haglund and I. B. Scofield.
"Tool Allotment and Costs," by F. A. Mance.
"New Methods of Processing Splined Shafts," by J. A. Ford.
"Problems Met in the Production of Air-Cooled Engines," by William Dunk.
"Some Experiences from a Production Notebook," by H. J. Crain and J. Brodie.
"Production Errors in Gears," by K. L. Herrmann.
"Selection of Machine Tools," by A. J. Baker.
"Machine Tool Efficiency," by R. K. Mitchell.

Progress in Adoption of A. S. M. E. Boiler Code

The A. S. M. E. boiler code has been adopted by the city of Parkersburg, W. Va., through the passage in that city of a city boiler inspection ordinance providing for the code except that covering the heating boiler section, which is to be taken care of in the city's building code. The code has also been incorporated in the building code of Omaha, Neb., which became effective July 28. The State of Washington, beginning Aug. 1, followed the A. S. M. E. rules in the operations of the safety commission of the State. Active work in the further introduction of the code is promised for 1923, as the legislatures of 25 States will convene next year, according to Charles E. Gorton, chairman of the administrative council of the American Uniform Boiler Law Society.

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High Costs and Steel Exports

It would be a mistake to conclude that the decision of the Consolidated Steel Corporation to go out of business means that American iron and steel manufacturers are to be thought of hereafter as less determined to reach out for a share of the outer world's trade in the products of their industries. The export subsidiary of the United States Steel Corporation is prosecuting as vigorously as ever its plans for the marketing of a portion of its output in other countries. The Bethlehem Steel Co., since its acquisition of the Lackawanna Steel Co., has taken steps to form its own export company, and others of the companies which have been associated in the Consolidated Steel Corporation under the provisions of the Webb Act may be expected to market a portion of their output abroad, probably selling through long established companies engaged in the general export trade.

It has been stated by one of the directors of the Consolidated Steel Corporation that present steel making costs in the United States prevent the company from competing for business in foreign countries; but that statement is to be considered in the light of the situation created by the elimination of Canada as a selling field of the Consolidated company. The acquisition of the Lackawanna Steel Co. by Bethlehem and the desire of the latter to handle Canadian trade from its Buffalo office presented a problem. Naturally the Lackawanna plant had had an important share of the Canadian business of the associated independent companies and the economies of adding Canada to the territory of the Bethlehem office at Buffalo were obvious. For like reasons other independent companies were interested in having a free hand in Mexico and in excepting that territory from the jurisdiction of the Consolidated company. It can be seen that with its Canadian business taken from it, probably more than one-third the total, while the business which remained was in countries across seas in which competition was keenest and unit selling cost highest, the Consolidated company's position quite warranted the statement that "present costs prevent it from competing for business in foreign countries."

The Consolidated Steel Corporation has been the largest and most important of the companies formed under the Webb Act for co-operation by American producers in the marketing of their products in foreign countries. The total ingot capacity of the associated companies was over 12,000,000 tons annually, and for a good many months in 1920 the sales of the Consolidated company ran above the 10 per cent of the represented capacity which it had been decided to devote to foreign trade, regardless of fluctuations in the home demand. An important contribution has been made to the good will created abroad for American steel products, and it is regrettable from more than one point of view that this strong representative of the domestic steel industry, which had been capably seconding the admirable work of the United States Steel Products Co., is to disappear from foreign markets. Its dissolution, along with like developments in connection with other co-operative export enterprises, suggests that the Webb Act has fallen considerably short of justifying the promises made for it and the prodigious effort put forth by business organizations to secure its enactment.

Distribution of National Income

It is notorious that the coal industry is receiving an altogether disproportionate share of the national income. Precise estimates are impossible, but approximations can be made with sufficient closeness to give an accurate general idea of the relation. The total income of the United States was about 33 billion in 1912, 34 billion in 1913, 61 billion in 1918 and 65 billion in 1920, according to the National Bureau of Economic Research for the earlier years and W. R. Ingalls for 1920. Mr. Ingalls sets 1919 at 66 and 1920 at 65½ billion. A fair guess for the rate at which the income is now running seems to be about 55 billion.

For a rough estimate, average prices realized on coal may be taken at $4 for bituminous and $8 for anthracite, which represent an income rate of 2.8 billion a year. This is giving the coal industry the benefit of the doubt. Allowing for expen-

ditures, the value income may be taken conservatively at 2.4 billion. This is 4.4 per cent of the total income as estimated.

There are about 42,000,000 persons in the United States gainfully occupied. About 750,000 of these may be assigned to the coal industry. This is 1.8 per cent of the total. These proportions, 1.8 per cent of the persons and 4.4 per cent of the income, stand in the ratio of 100 to 244.

The proportion is very good for those who receive the coal income and very bad for those who pay it. It is sometimes remarked that industry cannot stand taxes or drains like this. The burden, however, is well distributed, for if we start with 42 million persons receiving 55 billion income and deduct for coal we have 41¼ million receiving 52.6 billion. The first pair of figures makes an average income per person of $1,309.50, the second pair makes an average of $1,275.20. The reduction is only 2.62 per cent.

To increase prices is not to increase the intrinsic value of the national income. If all items were doubled—prices, services, wages, salaries, etc.—the national income would be expressed in twice as many dollars, but no one would receive in goods and services any more than formerly. Yet the operation would be relatively harmless. When, however, some prices and some wages are increased there is a change in distribution whereby some persons are made better off and the remainder are made worse off. The thing can be seen from two opposite viewpoints. When the price of one commodity is too high men have less money with which to buy other things. Also, those who receive the high price have more money with which to compete with the rest of the public in buying the general commodities that are available.

The condition is that certain items are costing too large a part of the national income and there is correspondingly less to spend on other things. The decrease in such expenditures does not attract general attention, but it occurs just the same. The individual has to do without things that formerly he could secure. Often, perhaps, he may not recognize his loss. In shoes or in furniture, for instance, he may appraise what he is receiving, by considering the number of dollars he parts with in a year, not observing that he is making less frequent purchases or is not getting as good quality as he used to get.

A substitute for iron grate bars which has its origin in Canada is another instance of the growing use of alloy steel castings. An inventor across the border is reported to have perfected heat-resisting steel castings which as grate bars in locomotive fire boxes have been in use over two and a half years and are still as good as new. The fact that they are 25 to 40 per cent lighter than ordinary iron bars largely offsets their higher first cost. They are reported to have none of the disadvantages of the iron bar, particularly as to change of shape due to growth. There is a large consumption of locomotive grate bars and it may be that an alloy iron casting may be developed which also will meet the exacting service requirements. Whether it be alloy iron or alloy steel, the development is only another step in the march of alloy progress.

Steel Supply Now and in 1913

The pig iron and steel output of the five leading countries of the world still lags and the totals are still far below those of 1913. Three years and a half have passed since the close of the war and the "world's hunger for steel," of which so much was written, has not yet been sharply felt. A comparison of data for the first half of 1922 with post-war and pre-war years is now possible and yields some interesting conclusions.

In the tables below the production of pig iron and steel is given for 1913, 1920 and 1921 and for the first half of 1922 in tons per month, based largely on the official data of the National Federation of Iron and Steel Manufacturers of Great Britain:

Output of Pig Iron and Steel in Five Countries, Gross Tons, Per Month

Pig Iron	1922*	1921	1920	1913
United States....	2,007,200	1,390,800	3,077,600	2,581,000
Great Britain....	358,200	217,600	669,500	855,000
France	371,100	280,300	281,700	427,000
Belgium	106,900	71,800	92,700	203,800
Germany	†510,000	508,000	464,000	1,373,000
Total per month	3,353,400	2,468,500	4,585,500	5,439,800
Year's output, tons.	†40,240,800	29,622,000	55,026,000	65,277,600
Steel				
United States....	2,614,100	1,645,300	3,511,000	2,608,000
Great Britain....	427,000	302,100	755,600	639,000
France	335,400	254,500	250,200	385,000
Belgium	98,000	65,000	101,300	202,300
Germany	†725,000	725,000	552,000	1,445,000
Total per month	4,199,500	2,991,900	5,170,100	5,279,300
Year's output, tons.	†50,394,000	35,902,800	62,041,200	63,351,600

*Six months' average, January to June. †Estimated, on basis of first six months, only.

Viewed as a whole two facts stand out: neither in pig iron nor steel will the world's output this year approach that of 1913, nor even that of 1920. The other striking feature is that Germany still ranks second and did in 1921 as well as in 1913. Of significance also is the relatively small amount of pig iron both this year and last as compared with pre-war output. The pig iron industry has by no means recovered to the same extent as steel.

Of unusual interest is the contrast this year between the American steel industry and that of the other countries. In none of the latter has there been any approach to pre-war output, unless Germany be excepted, taking account of her present reduced capacity. There is also the fact that American steel production this year has exceeded that of 1913, which is true of no other country, while pig iron output thus far is at a rate more than 500,000 tons per month less than in 1913. The slow recovery in the British steel industry is also noteworthy.

The present comparative activity in the American industry is in large part the expression of a peace-time demand for steel in compensation for what was pushed aside by the war. Better financial and economic conditions have brought it out. European countries will be a long time picking up any part of the so-called deferred demand for

steel. Events, indeed, have dealt rather hardly with the theory of a vast accumulation of business that was to bring prosperity to the industry in years immediately following the war.

Public Control of Industry

Even if dueling were not sinful, society would not permit men to go out into the street and shoot away at each other. A bystander might get hit. The case would be still stronger if it were apparent that one of the duelists was encouraged by the fact that the endangered bystanders were likely to interfere and try to induce his antagonist to apologize.

Strikes in the United States have reached just such a stage. All the important strikes are really directed against the public. Dust is thrown in the air by saying that it is not right to compel a man to work against his will, while the silent effort is continued to get the public to interfere. It is made to appear that there is only one party to the dispute whom the public can approach for the purpose of bringing about a settlement.

Dueling in the streets is not permitted. If there is an issue between two men means are provided for judgment. Society should not permit dueling in industry. The fond hope has been entertained that relations could be established between employers and employees whereby no issues would arise. In such case there would be no duels, hence no danger of bystanders getting hurt by a duel.

The question, then, is whether the causes of these industrial duels can be removed. If not, the issues must be settled in some other way. The notable fact in the history of strikes in the United States is that issues whose settlement by duel would not greatly injure the public have been largely eliminated, while strikes injurious to the public have thrived. The public is seriously injured by strikes of railroad workers, of coal miners and of artisans in the building trades. High wages in railroading are passed by legal enactment to the public, while in the other two cases the natural laws of trade make the public pay. The so-called "leaders" of the men involved do not conceal the fact that they aim to secure all they can obtain by the means that lie open to them. They do not admit that there is any limitation, and openly or otherwise they refuse to submit to comparisons with wages received by other workers.

By reason of the position openly or covertly taken by the leaders of these groups of men it is made clear that it is futile to attempt to remove grievances or issues. The situation is the same as would obtain with a duel in which one of the contestants was fighting not on account of a grievance, but because he insisted on discharging all the ammunition he chanced to have.

The public should adopt, therefore, a sort of Magna Charta to the effect that it will not tolerate industrial duels that are likely to injure it. In the endless discussion of labor matters the talk has been of means or expedients when there should first be a plain declaration of principle on the part of the public. The moral rights of labor have been defined repeatedly and there is really no question on that score. The rights of the public have not been similarly defined.

The question whether there should be industrial courts should not be entered upon until the public has decided plainly what its rights are and has decided that it is going to insist upon its rights. Then, and not until then, can the question of method be effectively entered upon. Hitherto the discussion has been whether industrial courts would "work." If public opinion were clearly defined means of one sort or another could be found to execute the public will.

The serious effect of the recent strikes and railroad embargoes on the American iron and steel export trade is reflected by the August statistics. The export total of 145,640 tons for that month was the smallest for this year, if we except February, and well under the 1921 average of 181,000 tons per month. September figures may make a still poorer showing. Of equal interest is the fact that American exports are considerably less than the British or German. The average British exports exceeded 250,000 tons per month to October 1 and German exports have been in excess of 200,000 tons per month. In proportion to the present steel output, American exports make probably the smallest showing in finished steel ever recorded.

New Edition of Fordney Tariff Act for Subscribers to The Iron Age

Of the edition of 8500 copies of the metal schedule of the Fordney tariff act printed by THE IRON AGE, less than 100 copies remain undistributed, as the demand has been extraordinary. A new edition is being printed, however, and will be ready for distribution this week to subscribers who ask for the pamphlet.

For handy reference, there has been printed also a limited edition of the Comparison of Tariff Rates published in THE IRON AGE of Sept. 28. This gives the rates on leading iron and steel products in the Fordney act and the two preceding tariff laws.

Simplication in Varieties of File

The United States Government through Secretary Hoover of the Department of Commerce has been urging manufacturers to simplify the variety of their product through the elimination of the items for which there is little demand or for which some more salable item can be substituted. Among the advantages pointed out are a reduction in the number of patterns and sizes, a quicker turnover, smaller stocks, prompter delivery and a better quality product. In response to the request to consider this conservation and simplification movement the Delta File Works curtailed its list of files and recently issued a price list covering all the files needed by 95 per cent of the buyers. The business of the other 5 per cent costs dealers more than it is worth, according to the Delta company.

The list was compiled through analysis of factory sales records extending over a period of years, and was offered to the dealers as a measure of co-operation in order to help them avoid slow sellers and dead stock.

CORRESPONDENCE

Steel Lumber for Buildings

To the Editor: In your issue of Sept. 14 there is a leading article on the above topic which is of no inconsiderable interest. As to fire protection it is always desirable to reduce to the least practicable minimum the quantity of fuel available when fire occurs. And from this point of view the thought emphasized in the article with respect to the use of steel lumber for floor joisting is in order.

From another point of view the emphasis given to fire protection through the use of this material is quite misleading, in my opinion. The fact that steel loses strength very rapidly at relatively low fire temperatures is generally known. The way in which unprotected steel performs under fire conditions is generally known. The article fails to describe effective means of protecting the steel joist assembly from such temperatures when serious occupancy fires occur within premises.

Assuming complete burnouts of contents of one or more floors in the building pictured on page 645, such as occurred, for instance, in the Burlington Office Building fire in Chicago in March of this year, it is not difficult to foresee substantially complete failure of the floor arch above the area in which the burnout occurred, with the possibility of spread of fire through such failure to floors above, until the roof assembly becomes involved.

Records, if any, of the actual performance of floor constructions resembling that described in the article, when subjected to actual and severe fire conditions, would be of interest. If any of these are available in your files or can be furnished by readers of THE IRON AGE, we should appreciate data permitting investigation.

A. R. SMALL,
Vice-president.

Underwriters' Laboratories,
207 East Ohio Street, Chicago,
Oct. 11, 1922.

Warner & Swasey Telescope for Argentina

One of the largest telescopes in the world, a 60-in. reflector, has been completed at the plant of the Warner & Swasey Co., Cleveland, for the Argentine National Observatory. The mechanism for the sidereal drive includes an accurate worm and worm gear, the latter being 9 ft. in diameter. The teeth of this worm gear are very accurately spaced from a master circle divided upon the Warner & Swasey automatic dividing engine. It is operated by a gear box mounted directly underneath, the gears of which were cut on a special machine accurate to one two hundred and sixty-thousandth part of a circle. This machine in turn is dependent for its reliability on the 40-in. dividing engine mentioned, which is exact to nearly a three-millionth part of a circle, believed to be without question the most precise dividing engine in the world. Among the great telescopes designed and constructed by the Warner & Swasey Co., are the 40-in. Yerkes, 36-in. Lick and 26-in. United States Naval refractors, and the 72-in. Canadian and 36-in. Arizona reflectors. While highly important, the designing and constructing of telescopes is, of course, incidental to the manufacture of machine tools by the Warner & Swasey Co.

The Zeigler Mfg. Co., Alexandria, Ind., after increasing equipment over 50 per cent since June 1, is constructing a new building 50 x 200 ft. in plan, one story in height, to add to its facilities. The company makes stampings, plain, formed, drawn and deep drawn, up to ½ in. thick and also screw machine products up to 3 5/16 in. in diameter. Its product goes to the automobile and automobile parts manufacturers and to skate, electric iron, washing machine, tractor, stove, tank, furniture and other industries using stampings or screw machine products.

Standardization of Electric Drills

What are believed to be the first standards for portable electric drills were adopted by the Electric Power Club on Aug. 20. They have been printed in bulletin No. 7900, obtainable by writing to S. N. Clarkson, executive secretary, 1017 Olive Street, St. Louis. The rules are the nucleus of a complete group of electric tool standards. What has already been accomplished includes a definition of what constitutes a portable electric drill, test requirements of the motors, performance specifications for drilling, standard sizes of drills and the information which should be given on electric drill name plates.

Electric drills are now widely used, not only for maintenance work, but also very largely as tools of production. The users of electric tools have felt for some time that these devices should be standardized and it was to meet this need that the power club's electric tool section, comprising the representative portable electric tool manufacturers of the country, undertook the work. The electric drill standards will be published in the next edition of the Electric Power Club's handbook covering all electric power apparatus standards.

Celebrate Founding of Disston Saw Business

On Sept. 26, Henry Disston & Sons, Inc., celebrated the 50th anniversary of the first excavation on its present factory site at Tacony, Pa. It was in 1872 that ground was broken for the first of the 68 factory buildings which now stretch over an expanse of 65 acres. In commemoration a corner stone was dedicated to that early beginning of Disston saw, tool and file

manufacture and to the extraordinary record of 54 veteran employees, each of whom has more than a half century of service with that company behind him. Assisting Jacob Disston, Sr., the only surviving son of the founder, in laying the corner stone was William Smith, who 50 years before had assisted the founder in the first breaking of ground.

To promote the growth of the demand for corrugated metal roofing and siding protected with asbestos and asphalt Johns-Manville, Inc., has been appointed joint selling agent by the H. H. Robertson Co. In the future all asbestos protected metal (more recently called Robertson process metal) roofing, siding, accessories and ventilators will be manufactured and shipped from the plant of Robertson company at Ambridge, near Pittsburgh. Hereafter in the manufacture of asbestos protected metal products the Johns-Manville asbestos saturated felts will be used, thus securing the advantages of the experience of Johns-Manville in the manufacture of saturated asbestos felts and the experience of the Robertson company in the fabricating of the finished product.

Standardization of nut, bolt and rivet proportions is to be pushed under the direction of the American Society of Mechanical Engineers, which has taken the unusual step that the committee in charge will be authorized to solicit funds from industries which will be benefited by the work.

COAL AND COKE OUTPUT

Beehive and By-Product Ovens Show Increased Activity

WASHINGTON, Oct. 17.—Production of soft coal for the week of Oct. 9-14, according to the Geological Survey, will show about 9,900,000 tons. During the past five weeks, the output has been at an almost uniform rate, varying little from an average of about 9,780,000 tons. The number of cars loaded on Oct. 9, as reported by the railroads, was 40,906, the largest reported this year. On Tuesday, loadings fell off to 29,239 cars and on Wednesday to 28,671 cars. Since the first of September, coal has been offered for shipment up to the ability of carriers to handle it.

The output of beehive coke continues to increase steadily, the Survey says, and freer movement of coal permitted a partial recovery in the output of by-product coke during September. The present rate of output of beehive coke is declared to be almost double that of the corresponding period of 1921, when the business depression was acute. In comparison with 1920, however, a decrease of 57 per cent is indicated. The accumulative output of beehive coke up to Oct. 7, stood at 4,954,000 tons.

The total production of by-product coke for September was 2,244,000 net tons, an increase over August of 450,000 tons. In spite of the increase, the output was 336,000 tons short of last June, when the maximum for the present year was reached. The by-product ovens operated during September at 63.2 per cent of capacity. Of the 71 plants, 57 were reported active and 14 idle. Production of beehive coke also increased, rising from 539,000 to 606,000 tons. The total production of coke in September was thus, 8,250,000 tons, an increase of 35 per cent over the average for 1921, but a decrease of 34 per cent when compared with 1920.

Although dumpings of soft coal into vessels at Lake Erie piers continued at a high rate, there was a slight decrease in the tonnage handled during the week ended Oct. 8 as compared with the preceding week. The Ore and Coal Exchange reports the total handled during the week ended Oct. 8 as 1,179,298 net tons, as against 1,245,373 tons in the week before. In comparison with the corresponding week of a year ago, this was an increase of 56 per cent. Of the total dumpings 1,142,332 tons were cargo coal and 36,966 tons were vessel fuel.

During the present season to Oct. 8, inclusive, 10,836,083 tons of cargo coal have been dumped into vessels at Lake Erie piers. Of this quantity 9,829,091 tons were forwarded to regular lake markets and 1,006,992 tons were forwarded to Lake Erie destinations not ordinarily taking Lake coal.

More Coke Ovens Going In

UNIONTOWN, PA., Oct. 15.—Car shortage in the region somewhat hampered production in the Connellsville region during the past week, although an increase over the preceding week was shown in output. Production for the week ending Oct. 7 was 126,350 tons, an increase over the preceding week of 7670 tons.

Coke production figures show 11,077 active ovens for the week ending Oct. 7 with a production of 126,350 tons. Revival of production of coke among independents is gaining steadily, the best record during the week being the resumption of three long idle plants in the region. The principal of these was Allison plant of W. J. Rainey, Inc., practically the first in the region affected by the strike on April 1. A total of 469 independent ovens was added to the active list during the week. The H. C. Frick Coke Co. put 201 additional ovens in operation during the week, making the active Frick ovens 7834 or an increase of 1170 more than it had in operation when the strike developed.

TO HELP MILLS

More Low Side Gondola Cars Made Available for Steel Shipments

WASHINGTON, Oct. 17.—The Car Service Division of the American Railway Association has responded to pleas of the iron and steel producers for more transportation to help in moving accumulated stocks in mill yards.

The following order was sent out last Tuesday by the Car Service Division to the railroads:

> To increase the car supply for transportation of steel mill products of which there is an accumulated storage at plants, the shipment of which is now needed for construction of all kinds, including freight cars, it is important that the low side or mill type of gondola car be immediately withdrawn from other service and assigned to the mill trade.
>
> Railroads not originating steel products and having in their possession this type of car will take necessary action to obtain release of foreign ownership equipment and forward in accordance with car service rules.

No reliable estimate could be made at the office of the Car Service Division as to how many of these low side cars would be released to the steel industry as a result of the order, but it is expected to give a fair degree of relief to the industry in supplying cars for the moving of accumulated stocks.

On last Wednesday, the division sent out a notice that Division Five of the Interstate Commerce Commission has ruled that no objection will be interposed to the movement of mill cinder and mill scale for furnace use, when moving in open top cars under the same conditions as fluxing stone for furnaces. It is hoped that this ruling also will allow mills to move this material more freely. Another ruling of the Interstate Commerce Commission of last week provides that empty coal cars should not be used for the movement of coke, but that special cases might warrant an exception to that rule and that they should be brought to the attention of Division Five of the commission for appropriate action. The purpose of this order is to continue to expedite the movement of coal and to keep coal car equipment exclusively in that service as far as possible.

Reports received by the Car Service Division show that 32,929 fewer freight cars were in need of repairs on Oct. 1 than on July 1 last, when the strike of railway shopmen began. The total number in need of repairs on Oct. 1 was 291,654 or 12.8 per cent of the cars on line. This was a decrease of 12,894 cars compared with the number in need of repairs on Sept. 15, at which time the total was 304,548 or 13.4 per cent. On Oct. 1 last year, 364,372 or 15.8 per cent were in need of repairs.

Of the total number in need of shop work, 230,565 require heavy repairs, while 61,089 require only light repairs. This is a decrease compared with Sept. 15 last of 11,114 in the number requiring heavy repairs, and a decrease of 1750 in the number needing light repairs. Every district reported a decrease in the number of cars in need of repairs on Oct. 1 compared with Sept. 15.

May Make Ferromanganese in Youngstown District

YOUNGSTOWN, Oct. 17.—Since a duty of $33.60 per ton has been imposed on ferromanganese under the new Fordney-McCumber tariff bill, independent interests in this territory have been considering the advisability of manufacturing their own ferromanganese, purchasing the ores on the market. Some point out that such a course might be advisable, in view of the fact that 78 to 82 per cent ferromanganese is now quoted at $101.10 seaboard, by importing interests.

It is explained that the duty on manganese ores is about $10 per ton less under the new tariff than the charge on ferromanganese, thus giving domestic makers an advantage over importers. One of the largest Valley independents consumes from 500 to 700 tons of ferromanganese per month in its steel operations.

The fact that a high temperature is required in a producing furnace is to be considered, however, in connection with domestic production. An expedient which has been considered is the use of smaller, more antiquated furnaces, where the cost of relining would not be so considerable as in the larger, modern stacks.

GERMAN PRICES SKYROCKETING

Advances in Steel Greater Than in Foundry Iron

(By Cable)

BERLIN, GERMANY, Oct. 16.—Foundry iron No. 1 is now 38,099 m. (per metric ton, equivalent to $13.55 per gross ton, at 3½ c. per 100 m.). Ingots are 57,640 m. ($20.50); steel bars, 78,700 m. (1.25c. per lb.); thin sheets, 116,970 m. (1.86 c. per lb.).

[This represents an advance in marks since Oct. 2 (see page 880, THE IRON AGE, Oct. 5) of 39 per cent on foundry iron and 68 per cent on each of the other products. The course of prices of these four items during the past few months is shown in the table.]

Date	Exchange per 100 M.	Foundry Iron: Marks per Metric Ton	Foundry Iron: Equivalent per Gross Ton	Steel Ingots: Marks per Metric Ton	Steel Ingots: Equivalent per Gross Ton	Steel Bars: Marks per Metric Ton	Steel Bars: Cents per Pound	Thin Sheets: Marks per Metric Ton	Thin Sheets: Cents per Pound
Oct. 16	3½c.	38,099	$13.55	57,640	$20.50	78,700	1.25	116,970	1.86
Oct. 2	5⅝c.	27,413	14.50	34,370	18.18	46,930	1.144	69,750	1.70
Sept. 18	7c.	26,242	18.67	34,370	24.44	46,930	1.49	69,750	2.22
Sept. 2	7¾c.	24,491	19.28	27,530	21.68	37,020	1.30	41,580	1.46
Aug. 19	8⅝c.	.....	....	17,880	15.21	24,050	0.91	.....	...
Aug. 8	13¼c.	10,481	14.11	15,670	21.09	21,070	1.266	30,330	1.823
July 4	22c.	7,261	16.23	8,520	19.04	11,470	1.145	16,490	1.645
April 1	33c.	5,549	18.60	7,170	24.04	9,500	1.445	12,770	1.91
Pre-war	$23.82	75½	18.27	82½	19.34	98	1.06	.....	...

GERMAN COMBINATIONS

The Rival to the Stinnes Organization—Electric, Metal and Shipping Companies Combine

BERLIN, GERMANY, Oct. 2.—There is great interest at present in corporation transactions, primarily in the gigantic new combination formed by Otto Wolff of Cologne (THE IRON AGE, Oct. 5, page 880), to rival the Electro-Metal Trust which Hugo Stinnes created from the Deutsch-Luxemburg, Gelsenkirchen, Bochum cast-steel and the three Siemens electrical corporations. Properly speaking, Otto Wolff is an iron and steel merchant, not a producer; but he controls producing corporations and also controls 80 per cent of Germany's tinplate production. Wolff lately made a stir by offering to reduce tinplate prices on condition that his customers should pledge themselves not to import from England. With Haniel and Dutch group (Nederlandsche Hoogoven), Wolff controls the big Phoenix corporation, which is the nucleus of the new combination. The Phoenix in turn controls partly or wholly nine corporations, including the important Reiherstieg shipyard of Hamburg, the Dolomitwerke, the Frigga Shipping Co. and a tube company. The Otto Wolff Trading Co. also leads in the Rhenish Steelworks Co., which controls wholly or partly five corporations, chief of which is the Arensbergshe Co. for Mining and Smelting, of Essen. Three-quarters of this company's shares are in the Rhenish Steel Co.'s hands. The Phoenix and Rhenish steel companies, with their fourteen subordinate corporations, constitute the metal wing of the new organization, and play the same rôle as the Deutsch-Luxemburg, Gelsenkirchen and Bochum Steel play in Stinnes' concern.

The electric wing consists of the Dessau Gas Corporation, which controls thirteen important gas and electric light and power companies and also controls the workshops of Max Schorch & Co. of Rheydt in Westphalia. In turn this big electrical group is connected by mutual exchange of shares with the Sachsen Light & Power Co. The Sachsen company, which has a capital of 140,000,000 m., was small before the war; but it has rapidly developed and is now the biggest company of its kind in Saxony. In order to fuse the two wings, it is proposed to make a further exchange of shares between the Phoenix corporation, the Sachsen company, and the Max Schorch company. Through this deal the Sachsen company will acquire a majority control of the Schorch company.

This, however, does not complete the deal. Like the Stinnes Electro-Montan trust it will have big shipping, as well as shipbuilding, connections. Herr Wolff lately surrendered to the Roland Steamship Line his interest in the Argos line. The Roland line is controlled by the North German Lloyd. It is now announced that Otto Wolff will have representation on the control boards (*Aufsichtsraete*) of both the Roland and North German Lloyd. Through this deal the Electro-Metal Trust really becomes an electro-metal-shipping trust; and, through the North German Lloyd's American associations, it becomes an object of interest to Americans. Just as Stinnes uses his new Stinnes line for the foreign trade done by his corporations, so the Wolff organization will use for its foreign trade the shipping of its controlled or associated companies.

The new trust follows the Stinnes example by proclaiming that financially and administratively all the allied concerns will maintain their independence; but as with Stinnes so with the new trust, all threads will lead to the control of Herr Wolff. The news of the combination has created a sensation; and it is predicted that still further unions on similar lines will take place not only in the metal and mechanical but also in very different industries.

Commenting, the Berlin *Boersen Courier* says: "This new event in the concentration movement of German industry signifies a big step forward toward simplification and standardization of production processes; and the importance of the new electro-metal combine is thereby sufficiently proved. The trust guarantees for another great part of our industry that the profits of native labor will go to national economy, and it creates a new strong front against foreign competition."

German Prices More Stable

All German prices are, in a sense, merely functions of the Reichsmark exchange. This has been true of iron and steel prices since 1918; but it has been doubly true since the Eisenwirtschaftsbund three weeks ago decided to fix its prices every ten days according to the dollar exchange. As the mark had a big recovery after touching botton Aug. 27, and as this recovery has on the whole been maintained, the price-rise for pig-iron has for the moment come to an end. Changes of late have been slight. Prices from Oct. 1 are: Hematite, 30,544 m. per metric ton; foundry iron No. 1, 27,413 m.; foundry iron No. III, 27,343 m.; Sieger-land steel-making iron, 29,763 m.; spiegeleisen, 32,483 m.; and ferrosilicon, 34,443 m. None of these exceeds by more than about 200 marks the prices attained on Sept. 1, but they are about double the prices fixed on Aug. 21. The price question has for the moment fallen into the background, but it will again become acute if (as is likely enough) the mark exchange fall is resumed.

Youngstown industries distributed $4,718,589 in wages in September, the largest disbursement in 18 months, reflecting the effects of the wage advance granted to steel workers beginning Sept. 1. It exceeds the August payroll by $303,824 and the September, 1921, distribution by $1,292,587.

BELGIAN MARKET WEAKER

Softness in Semi-Finished Material, But Pig Iron Market Strong—Larger Ore Imports

BRUSSELS, BELGIUM, Oct. 6.—Belgium, whose domestic demand is bearing a much smaller ratio to output than is the case in France, is more sensitive to the influence of foreign events. The difficulties in the Near East, which assumed a critical aspect, were the signal for a slackening at the beginning of this month. Business is now quiet and consumers are only covering their immediate needs. Prices, however, are thus far holding firm.

The recent reduction of railroad rates on French iron ore caused an increase in Belgian ore imports, the prices of which are still advantageous. Quotations at mines are: Briey minette, 14 to 15 fr.; Thionville minette, 11 fr.; siliceous iron ore, Longwy-Nancy, 10 to 13 fr.

France exported to Belgium during the first seven months of 1922, 1,037,235 metric tons of iron ore, against 840,176 metric tons during the same period of 1921.

Foundry Pig Iron.—The pig iron market is firm and rising prices are quoted, but this is believed to be an effect of speculation. Available stocks of foundry iron are restricted. Chill-cast foundry iron No. 3 P. L. is quoted at 245 to 250 fr., delivered, in the home market and 240 to 245 fr. f.o.b. Antwerp. Luxemburg and Lorraine iron is slightly higher.

Semi-Finished Material.—Inquiry for these products exceeds production. Lorraine and Luxemburg mills have returned to the Belgian market, but are quoting slightly higher prices on basic steel. Delivered prices on Belgian and prices f.o.b. Antwerp on Lorraine and Luxemburg material are as follows:

	—Fr. Per Metric Ton—	
	Belgium	Luxemburg and Lorraine
Ingots	310 to 315	310 to 320
Blooms	330 to 335	330 to 335
Billets	345 to 355	350 to 360
Sheet billets	370 to 375	370 to 380

France exported to Belgium during the first seven months of 1922, 175,773 tons of semi-finished steel, compared with 195,840 tons for the same period of 1921.

Rolled Products.—Rolled steel products are particularly affected by the weaker tendency of the market. Heavy beams are inactive. Delivered domestic prices and prices for export, f.o.b. Antwerp, on Belgian, Luxemburg and Lorraine material, are as follows, in francs per metric ton:

	Belgian Domestic	Belgian Export	Lorraine and Luxemburg Export
Bars	435 to 440	430 to 435	430 to 435
Heavy beams	400 to 405	385 to 410*	390 to 410*
Light beams	415 to 425		
Angles (according to size)	415 to 440	410 to 435	
Rails	425 to 450		420 to 425
Hoops and strip	650 to 660		650 to 660
Wire	495 to 505	495 to 500	490 to 505
Rods	510 to 520	505 to 515	500 to 520

*Depending upon size.

Iron products are quiet, but seem to be firmer than steel products. Present prices are: No. 2, delivered, 425 to 435 fr.; No. 2, f.o.b. Antwerp, 420 to 435 fr.; No. 3, delivered, 450 to 460 fr.; No. 3, f.o.b. Antwerp, 440 to 460 fr.

Plates and Sheets.—Although the sheet market has not yet receded from its previous firmness, business is much quieter than it was three weeks ago. For export, prices of heavy sheets are most in demand.

Present delivered prices for the domestic market (basic steel) are as follows:

	Fr. Per Metric Ton
3 to 5 mm. and heavier	470 to 530
12/10 to 2 mm	560 to 730
5/10 to 1 mm	770 to 900

For export, f.o.b. Antwerp, sheets of 3 to 5 mm. and heavier are quoted at 450 to 520 fr. Luxemburg mills are quoting f.o.b. Antwerp 450 to 460 fr. for basic sheets 5 mm. and heavier, and Lorraine mills f.o.b. Antwerp, 490 to 500 fr. for 5 mm. and heavier basic sheets and 575 to 600 fr. for medium sheets.

Steel Castings.—There is keen competition in this line, but some improvement is noticeable and prices are holding better.

August Blast Furnace Operation Shows Increase

In August Belgium had 29 furnaces in blast, against 27 in July and monthly averages of 14 in 1921 and 54 in 1913.

Production of pig iron:

	Tons
August, 1922	154,000
July, 1922	127,000
Monthly average, 1921	73,000
Monthly average, 1913	207,000

FRENCH MARKET FIRM

Coke Supply Obstructs Increased Production—Pig Iron Strong—Semi-Finished Material Quiet But Firm

PARIS, FRANCE, Sept. 28.—The French iron and steel market is firm, with a healthy undertone, and prices are rising slowly. Domestic demand, while not so important as it was in August and in the early part of September, is still quite satisfactory considering the season. In the export field, the appreciation of the pound sterling, the depreciation of the German mark and the aftermath of the strikes in the United States offer exceptional opportunities for foreign trade to France, Belgium and Luxemburg.

Unfortunately, the present coke supply does not permit an increase in pig iron production much beyond the present volume, which is less than one-half of the capacity of the country.

This coke supply is made up as follows (monthly): 427,000 tons of Ruhr coke granted by Commission of Reparations; about 80,000 tons from French collieries; about 40,000 tons from Belgium; 33,000 tons of Ruhr coking slacks on reparations account.

Even though Germany delivered her full complement, it is obvious that this total of about 550,000 tons of coke is far from sufficient for a yearly production capacity which exceeds 10,000,000 tons of pig iron.

France ought to have at her disposal at least 200,000 tons of coke more per month. This can only be Ruhr coke, because there is none other obtainable. The large companies of Lorraine, which are not really rentable unless they be run at full capacity, have now just enough coke to work at half capacity.

Some men, well versed in those questions, have suggested that what France failed to obtain politically might perhaps be obtained more easily by means of a private understanding between French and German iron and coalmasters. Provided the Ruhr producers should admit that the French blast furnaces of the East and in Lorraine have a right to German coke up to the limit of their production, French iron masters would agree, it is suggested, to sell to German transformation works pig iron and semi-finished products at privileged prices, thus re-establishing, to a certain extent, the community of interests which existed before the war between the Lorraine blast furnaces and the Ruhr transformation works.

Germany delivered to France (without Luxemburg), in August, 344,400 tons of reparations coke, or a daily average of 11,100 tons, against 13,774 tons due. In the first fortnight of September, German coke shipments to France showed a marked progress and reached the daily average of 12,950 tons.

The adjusted price of German coke delivered to French blast furnaces through the Société des Cokes de Hauts-Fourneaux has been maintained for October at the same level as in September, 95 fr. per ton, Franco-German frontier; and it is considered, in well-informed circles, as extremely probable that this price will stand until the end of this year. This is considered a very high price, in comparison with the present price of British furnace coke, 27s. delivered at works.

Foundry Iron.—This market is firm and available supplies are scarce. While chill-cast foundry pig iron No. 3 P. L. was averaging 220 fr. for September

delivery, the price for October has been raised to 230 fr.; and it is predicted that 240 fr. will be reached before the end of this year, three times the pre-war price.

For export, French blast furnaces have been selling at 225 fr. (French currency) f.o.b. Antwerp, thus relinquishing, against transportation costs, a part of the export bounty on coke of 20 fr. per ton of coke used in the production of exported pig iron. Some deals have been concluded with North America. One Lorraine concern has sold to that destination the whole of its production of semi-phosphoric foundry iron until the end of this year, and another in the same district several thousands of tons of high grade foundry iron, low in sulphur, at 250 to 260 fr. (French currency) f.o.b. Antwerp, which is equivalent to $22 or $23 c.i.f. American ports.

Hematite Pig Iron.—The French hematite market is in a favorable position and orders are coming in regularly. The passing away of the Comptoir des Fontes Hématites, occurring as it has at the start of a rising movement, has been smoother than was the suppression, at the beginning of last year, of the comptoir de Longwy, which heralded the collapse of foundry iron prices.

Prices of hematite are variable according to districts, and are now oscillating between 250 and 290 fr. per ton at producing works. In the Paris area, the present delivered price is 315 to 325 fr., about the same as the price last quoted by the Comptoir.

Semi-Finished Steel.—Although inland demand is now quieter, order books at works are well filled and delays of delivery vary between two and three months. Prices, which have a rising tendency, average as follows on basic steel at producing works in the East of France or in Lorraine:

	Fr. Per Metric Ton
Ingots	310 to 315
Blooms	320 to 325
Billets	340 to 350
Sheet billets	380 to 390

Beams.—With the building season drawing to a close, orders for beams have become smaller, but mills still have good orders on their books. The Comptoir Sidérurgique, which controls inland sales of beams and rails, will shortly make a decision as to the future price of beams. Some of the associate firms urge the maintenance of the present base price of 475 fr., delivered, which has been ruling since last March, but a majority of members hold that the base price should be raised as the general trend of the market is upward and coke prices are high.

Rails.—The Comptoir Sidérurgique booked an order for about 50,000 tons last month for the upkeep of various French railroads.

Plates and Sheets.—Although orders have somewhat slackened, the tendency of the market is still strong. At its meeting of Sept. 22, the Comptoir des Tôles et Larges Plats, moved by the present state of the market in which foreign inland competition has almost ceased, as well as by the recent rise in price of Belgian sheets and by the high price of coke, determined upon the following increases of its base prices:

	Fr. Per Metric Ton	
	Old Price	New Price
Flats	590	610
Heavy sheets	640	650
Medium sheets	720	730
Light sheets	900	930

Present delays of delivery are about 10 weeks for light sheets, 6 to 8 weeks for medium sheets and 4 to 6 weeks for heavy sheets and flats.

Rolled Merchant Products.—Although the market is firm and rising, prices of rolled merchant products are rather irregular. Quotations vary according to districts, tonnages, composition of orders and times of delivery. For instance, one firm, whose delays of delivery vary between 6 and 18 weeks according to specifications, is selling at 445 fr.; but another, which offers 4 to 6 weeks delivery, is asking as high as 470 fr. Another firm is quoting 450 fr. and 445 fr. for good specifications, but declines to name delivery date, while another firm, which has order books filled for four months ahead, refuses to quote.

Castings.—The previously reported improvement has fully developed, and many foundries are now working at full capacity or are in search of labor, which, especially in the provinces, is scarce. Prices have improved and some foundries have increased quotations by 50 or 100 fr. since July. Orders for malleable pig iron castings from the automobile trade continue satisfactory.

Construction.—After a two year idleness, engineering firms building special machines report that more orders are being received.

JAPANESE MARKET QUIET

Copper Demand Low—Further Declines in Pig Iron Not Expected

SHANGHAI, CHINA, Sept. 20.—As was expected, prices of electrolytic copper in Japan advanced when the import duty was increased, and transactions in copper have tended to decrease. Owing to the decline in price of copper experienced since last year, there arose a tendency to use copper in the manufacturing of furniture, household utensils, and other ways in Japan, but when the prices of copper rose, the demand of copper ware decreased by degrees. In addition, owing to the improvement in price, exports of copper and copper goods shipped to China and the South Seas also decreased. As there is a good deal of imported scrap copper in the market manufacturers are now using it as material for copper ware, and the demand for electrolytic copper has greatly fallen off.

Six hundred workmen employed in the Innoshima branch factory of the Osaka Iron Works have been dismissed owing to the economic slump. The firm still retains service of 1400 men.

Improvement is sighted in the pig iron market in Kobe, although it is still quiet. Hope is entertained by holders that no more price declines will be witnessed. On July 1 the stock of pig iron fell below 200,000 tons, but at the end of last month the market again fell, due to importation of low-priced Indian iron.

Prices are indecisive and weak. No. 1 Kamasihi is quoted at yen 67 ($32.15) per ton against yen 68 at the close of last week. However, operators believe that the bottom has been reached, and state that no more declines are possible.

June's iron output in Japan amounted to 3004 tons, a decrease of 1.5 per cent. Since the entry of Great Britain and the United States into the field of metal importation in Manchuria, these two countries have made rapid encroachments on the trade formerly enjoyed by Japan. During last year, trade statistics indicate that some $6,000,000 worth of metal goods went into Manchuria. In specific items, Great Britain supplied about one half of all brass bars, rods, sheets and the like. Likewise she furnished galvanized iron sheets, lead in bars and tin. Japan is ahead in the copper supply and also has a fair share of aluminum utensils.

United States Furnishes Three-Fourths of Guatemala's Iron and Steel Manufactures

American shipments of manufactures of iron and steel into Guatemala are about the same as they were in 1913, in bulk, but considerably more in dollars, from the increased average price. This condition obtains in spite of a marked decrease in the total imports, as measured by bulk, from more than 7000 metric tons in 1913 to 5237 tons in 1920 and 5705 tons in 1921. The figures in the table show that the United States percentage has increased from 63 in 1913 to 84 in 1920 and fallen to 75 in 1921.

Imports into Guatemala of Iron and Steel Manufactures

	1913		1920		1921	
Source	Metric Tons	Value	Metric Tons	Value	Metric Tons	Value
United States	4,382	$384,094	4,469	$1,029,479	4,263	$872,453
Germany ..	1,593	181,538	243	79,280	594	225,897
England ...	780	97,435	425	131,466	756	153,717
Others	247	22,480	100	21,385	92	37,192
Total	7,002	685,547	5,237	1,261,610	5,705	1,289,259

Iron and Steel Markets

AN EASIER MARKET

Car Troubles Continue, But Mill Accumulations No Larger

Downward Trend in Coke and Pig Iron — Prompt Steel at 2 Cents

Prices and supplies of finished steel have been working toward easier conditions in the past week. Accumulations of rolled products at Pittsburgh and Youngstown mills are still large—probably upward of 300,000 tons. But the accumulations are not increasing, and the week has brought eight more blast furnaces into action.

Transportation difficulties promise to continue, but producers and consumers of steel are accepting a 70 per cent output as close to the probable maximum for the remainder of the year. Meanwhile, in contrast with their action during the coal strike, consumers are doing little buying for prompt delivery. The effect of this changed policy has become more marked, making this week the quietest Pittsburgh has had in several months in the matter of new demand.

Fair-sized orders for plates, shapes and bars can now be placed more readily at 2c., Pittsburgh, and some mills will make early deliveries on that basis. Chicago reports that a number of users of steel now prefer to wait for regular deliveries of contract material, even though in so doing they are forced to curtail operations somewhat. This is the case with some car shops, in spite of railroad urging for delivery of new cars.

There are indications that duplicate buying figured to an extent in producing the price peaks of the coal strike months. The amount of such buying will determine in part the course of prices in the next two months.

The fuel situation is steadily more favorable to buyers. Connellsville coke producers are more actively seeking business, and furnace coke has been offered at $9 for delivery over the remainder of the year.

Farm implement makers are still a small figure in the bar market and now look for a quieter manufacturing season than was indicated in the summer months. On the other hand many automobile plants are holding their high rate of production and some are planning increased capacity.

Chicago district sales of steel rails for the first half of 1923 are now put at 650,000 tons and track supplies at 200,000 tons.

In light rails competition has been more marked of late, and as low as 2c., Pittsburgh, has been done in some cases. German light rails have been offered at $36 per gross ton, New York, and at $39, San Francisco.

Awards and inquiries for fabricated steel work continue to call for good amounts of material, but it is a few large rather than many small structures that account for the tonnage. Census figures for September lettings show that business for that month, corresponding to 62 per cent of shop capacity, was not much below that of August, representing 65 per cent.

Sales of 62 locomotives were made in the week and inquiries came out for 41. Cars bought exceeded 2200 and there are fresh inquiries for 1150.

The trend of pig iron prices is still downward and the week has been one of limited sales. At Chicago, prices have receded $1, while at Buffalo resale iron has been bought at $29.50, or $2.50 below recent quotations, and furnaces are selling at $31. At Pittsburgh, basic has declined $1. Recent high quotations on Southern iron, which were largely nominal, have disappeared and little is being sold above $27.50. Throughout the country, consumers of foundry iron are hesitating about placing further orders.

The ability of merchant furnaces to compete with prices at which some steel companies have sold pig iron recently will depend on the extent to which contract coke comes down.

British exports of iron and steel in September amounted to 279,169 tons, compared with 281,954 tons in August and 251,743 tons in July. The United States total in August was 145,640 tons. This country is still inquiring for pig iron in Great Britain and sales are being made covering December and January shipment. British steel prices generally are lower.

THE IRON AGE pig iron composite has fallen to $30.27 per gross ton from $30.94 last week. The price is back now to the level of Sept. 1.

Finished steel has not changed in price, THE IRON AGE composite price remaining at 2.460c. per lb., as last week. This is close to the figure of July, 1921, midway in the long decline from the peak of 1920.

Pittsburgh

Buyers Hesitate and Market Is Quiet—Car Supply Improves Slowly

PITTSBURGH, Oct. 17.—Downward trend of pig iron prices in keeping with an easier fuel situation has tended to intensify the hesitancy recently observed in the demand for finished steel products, and the past week, as far as new business is concerned, has been the quietest the trade has experienced in some time. With most of the steel companies having order books which insure comparatively full operation of capacity over the remainder of the year, pressure to sell is not heavy and there has been no breaking through the recent minimum quotations. Nevertheless, the undertone of the market is weaker as a result of the decline in new commitments and recent maximum quotations on a number of products, notably plates, shapes and bars, have been considerably modified. On really sizable orders of these products, it is doubtful whether the market to-day is above 2c., Pittsburgh, for sales above this figure usually refer to small tonnages or occasional requirements where early delivery is essential.

Prices of above $40, Pittsburgh or Youngstown, for sheet bars, billets and slabs have disappeared, but the fact that some sizable tonnages of sheet bars have been placed at $40 within the week would indicate that not

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 17, 1922	Oct. 10, 1922	Sept. 19, 1922	Oct. 18, 1921
No. 2X, Philadelphia‡	$33.14	$33.14	$34.26	$22.40
No. 2, Valley furnace†	32.50	32.50	36.50	21.00
No. 2, Southern, Cin'ti†	31.55	31.55	31.05	23.50
No. 2, Birmingham, Ala.†	27.50	27.50	25.00	19.00
No. 2 foundry, Chicago**	*31.00*	32.00	32.00	21.00
Basic, del'd, eastern Pa.	29.50	29.50	31.00	20.50
Basic, Valley furnace	*30.00*	31.00	34.00	19.25
Bessemer, Pittsburgh	35.27	35.27	35.77	21.96
Malleable, Chicago**	*31.00*	32.00	32.00	21.00
Malleable, Valley	33.00	33.00	34.00	20.50
Gray forge, Pittsburgh	*32.77*	33.77	37.77	21.96
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, seaboard	*67.50	*67.50	67.50	60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$40.00	$47.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	29.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	29.00
O.-h. sheet bars, P'gh	40.00	40.00	40.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	35.00
O.-h. billets, Phila.	45.17	45.17	45.17	35.74
Wire rods, Pittsburgh	45.00	45.00	47.50	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.60
Light rails at mill	*2.00*	2.25	2.25	1.70

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.475	2.475	2.575	1.95
Iron bars, Chicago	2.50	2.50	2.25	1.75
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.75
Steel bars, New York	*2.34*	2.44	2.34	1.88
Tank plates, Pittsburgh	2.15	2.15	2.25	1.60
Tank plates, Chicago	2.30	2.30	2.30	1.75
Tank plates, New York	*2.34*	2.49	2.49	1.98
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Beams, Chicago	2.20	2.20	2.20	1.75
Beams, New York	*2.34*	2.44	2.34	1.98
Steel hoops, Pittsburgh	2.90	2.90	2.75	2.25

*C.i.f.

**The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Oct. 17, 1922	Oct. 10, 1922	Sept. 19, 1922	Oct. 18, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.50	3.50	3.35	3.00
Sheets, galv., No. 28, P'gh	4.50	4.50	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.60	2.60	2.50	2.25
Wire nails, Pittsburgh	2.70	2.70	2.60	2.90
Plain wire, Pittsburgh	2.45	2.45	2.35	2.60
Barbed wire, galv., P'gh	3.35	3.35	3.15	3.55
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	$25.00	$25.00	$24.50	$17.00
Carwheels, Philadelphia	23.00	23.00	23.00	17.00
Heavy steel scrap, P'gh	21.50	21.50	21.00	14.00
Heavy steel scrap, Phila.	18.00	18.00	18.00	12.50
Heavy steel scrap, Ch'go	18.50	18.50	18.00	13.00
No. 1 cast, Pittsburgh	24.00	24.00	24.00	17.50
No. 1 cast, Philadelphia	23.00	23.00	23.00	17.00
No. 1 cast, Ch'go (net ton)	21.00	21.00	21.00	14.50
No. 1 RR. wrot, Phila.	*22.00*	23.00	22.00	16.00
No. 1 RR. wrot, Ch'go (net)	*17.75*	18.25	17.50	13.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$10.00*	$11.00	$11.50	$3.25
Foundry coke, prompt	*12.00*	13.00	12.50	4.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	13.60
Electrolytic copper, refinery	*13.62½*	13.75	13.75	12.75
Zinc, St. Louis	**6.85**	6.62½	6.65	4.67½
Zinc, New York	**7.20**	6.97½	7.00	5.17½
Lead, St. Louis	6.35	6.35	5.90	4.50
Lead, New York	**6.65**	6.60	6.25	4.70
Tin (Straits), New York	**34.50**	33.50	32.12½	28.00
Antimony (Asiatic), N. Y.	6.75	6.75	6.75	5.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Oct. 17, 1922, Finished Steel, 2.460c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Oct. 10, 1922,	2.460c.
Sept. 19, 1922,	2.419c.
Oct. 18, 1921,	2.221c.
10-year pre-war average,	1.689c.

Composite Price, Oct. 17, 1922, Pig Iron, $30.27 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 10, 1922,	$30.94
Sept. 19, 1922,	32.54
Oct. 18, 1921,	20.03
10-year pre-war average,	15.72

less than that price can now be done. Material advances over what are recognized as the minimum prices on sheets no longer are readily obtainable. Despite the fact that makers of tubular goods have caught up fairly well with their orders for oil well pipe and that the demand for this class of material is light on account of the curtailment of oil production, there are intimations of easier prices for these products. The firmest spot in the market at the moment seems to be in hot-rolled flats on which all makers are heavily obligated.

Railroad transportation conditions still are very unsatisfactory, but as a result of modifications of embargoes the movement of material from the mills has improved somewhat and if mill stocks have not declined they are at least no heavier than they were a week ago. The Carnegie Steel Co. since a week ago has put on two additional furnaces at its Farrell, Pa., works, and also started up the steel works at that plant. Steel Corporation subsidiaries dependent upon this plant for billets and sheet bars, however, will be deprived of supplies for a few weeks at least, on account of an accident to the blooming mill engine. Operations of independent steel works in this district range from 65 to 75 per cent of capacity, while in the Youngstown district 90 per cent of the open-hearth furnaces and all of the Bessemer plants are in operation. There has been a further increase in the number of active blast furnaces in this and nearby districts. In addition to the two Carnegie stacks at Farrell, Pa., the Jones & Laughlin Steel Co. has put on its last idle furnace at its Aliquippa works, and the Cherry Valley furnace of the Hanna Furnace Co., Leetonia, Ohio, has gone into blast. The Wheeling Steel Corporation has banked a furnace at Martins Ferry, Ohio. The total number of furnaces in blast in this and nearby districts now is 85 out of a total of 139.

Pig Iron.—The week has been a very quiet one, buyers being impressed with the weaker tendency of prices, as well as a lower market in coke, forecasting still lower

prices for iron, evidently believing that this is a good time to refrain from purchasing. Steel company offerings of basic have forced a further decline in the grade of $1 per ton. We note sales at $30, Johnstown, Pa., and that price now is being named by one merchant interest and a couple of steel companies in the Valley district. It is intimated that less than $30 might be done on some of the iron sold a little more than a month ago by a Valley steel maker, much above the current prices. Not enough business has been done in other grades to establish any change in prices, except on No. 3 foundry, which has been sold as low as $31, Valley furnace, to a Pittsburgh district maker of mine cars. Considerable British iron has been offered in this district lately at around $33, delivered, for all grades, while high phosphorus foundry iron from Luxemburg and Lorraine is being offered at $23.25, c.i.f. Atlantic seaboard. Some of the sanitary ware manufacturers several weeks ago bought some British foundry iron at about $31, delivered, but there has been no recent business.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$30.00
Bessemer	33.50
Gray forge	$31.00 to 32.00
No. 2 foundry	32.50 to 34.00
No. 3 foundry	31.00 to 32.00
Malleable	33.00

Ferroalloys.—Business is of moderate proportions because, as a rule, consumers are well covered against their requirements over the remainder of the year. Domestic producers of ferromanganese have not yet announced prices. This occasions some surprise, but it is stated in explanation that the difference between the duty on manganese ore and ferromanganese is too slight on the present cost of coke for profitable production. There is a feeling that coke prices are coming down, and since every decline of $1 a ton in coke would be equivalent to a drop of $2.50 per ton in ferromanganese, it is desirable to await a more settled market in coke before starting the production of ferromanganese. The demand for the most part is for carload lots, wanted urgently by small consumers and these are being supplied from British material at the full prices of $101.10, duty paid, Atlantic seaboard, for 80 per cent material. Spiegeleisen is dull and easy. Carload lots of 20 per cent material lately have been sold at $38, furnace, as against an asking price of $39 for such lots. Ferrotungsten is finding some sale at 85c. to $1 per lb. contained tungsten, the range being unusually wide because of the variations in impurities. Chrome ore is in brisk demand at $20 per net ton, Atlantic seaboard, for forward delivery and $22 for prompt shipment.

We quote 80 per cent British ferromanganese, $67.50 c.i.f. Atlantic seaboard; domestic producers have not yet announced prices. Average 20 per cent spiegeleisen, $38 furnace; 16 to 19 per cent, $37; 50 per cent ferrosilicon, domestic, $65 furnace. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $50.50; 11 per cent, $53.80; 12 per cent, $57.10; 13 per cent, $61.10; 14 per cent, $64.10; silvery iron, 6 per cent, $39; 7 per cent, $40; 8 per cent, $41.50; 9 per cent, $43.50; 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Billets, Sheet Bars and Slabs.—We note sales of sheet bars from Youngstown mills aggregating about 15,000 tons at a flat price of $40. The fact that this business, which was attractive in other ways than its size, failed to develop a lower price indicates that the market is fairly well established at that figure. At the same time, however, there has been a complete disappearance of prices above that level, makers who recently were asking more now being glad to get orders at $40, Pittsburgh or Youngstown. Billets and slabs also are priced at $40, Pittsburgh or Youngstown, but real activity is lacking and it is possible that an attractive order might develop a lower price. Most steel makers have orders sufficient to maintain finishing mill operations at about 70 per cent of capacity over the remainder of the year, but some are not as well situated and have some tonnages of semifinished steel for market. These offerings and the weakness of pig iron are responsible for a disposition on the part of nonintegrated mills to expect lower prices.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $40; 2 x 2-in. billets, $40; Bessemer sheet bars, $40; open-hearth sheet bars, $40; slabs, $40; forging billets, ordinary carbons, $45 to $47, all f.o.b. Pittsburgh or Youngstown mills.

Wire Rods.—Independent makers still are holding to $47.50 for the base size of common soft rods and are making sales at that figure. We note one sale of 200 tons for delivery in equal quantities in November and December at that price and other sales for early delivery also carry that price. Contract customers, however, are not paying over $45, and some are getting shipments on old orders even below that. The leading interest is not taking new business.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Wire Products.—Little excitement attends the demand, but in a quiet way business is good and is described by one producer as too good, since its orders over the first half of this month were fully 50 per cent in excess of its normal production. The desire of independent companies seems to be to avoid loading up at to-day's prices. The leading interest still is far behind in its merchant sales and is taking no business it can afford to pass up. Operations of this interest, which were expected to gain as a result of the resumption of the Farrell, Pa., works of the Carnegie Steel Co., have not increased because an accident to the blooming mill engine at that plant means that no billets will be available from those works for from four to six weeks. There has been no change in prices, present levels apparently being satisfactory to buyers, presumably because they are getting some deliveries on old orders carrying lower prices. Prices are given on page 1039.

Steel Rails.—There lately has developed considerable competition among makers for orders of light rails and this has resulted in a price as low as 2c., base, being named on these sections rolled from new steel. Some makers still are quoting 2.25c., but admit considerable trouble in making sales at that price.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.25c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—The situation in soft steel bars is slightly weaker, due probably to the fact that consumers are getting better deliveries on some of their low priced orders, and average costs have fallen so well below 2c. that they are not interested in fresh supplies at much above that level. Small tonnages for early delivery are selling at 2.10c. and occasionally at 2.15c., but the recent maximum of 2.25c. has pretty well disappeared. Iron bars are unchanged.

We quote steel bars rolled from billets at 2c. to 2.15c.; reinforcing bars, rolled from billets, 2c. to 2.15c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Plates.—It is getting steadily easier to obtain accommodation at 2.25c., even on small tonnages, and the price must now be regarded not only as maximum, but somewhat extreme against really desirable business. The Sinclair Oil Corporation is taking bids on 10 80,000-barrel tanks for Oklahoma, which will require about 3000 tons of plates. General demand is moderate and usually for small tonnages. Prices are given on page 1039.

Tubular Goods.—Pipe makers in this and nearby districts report a well sustained demand for standard pipe, notably in the butt weld sizes, but only a limited demand for oil country goods. It is reported that there has been a suspension of operations in the Osage field, and in most other oil producing districts the low price of oil is restricting both production and new development. Most makers of steel oil country pipe now are able to make comparatively early delivery against new business, and there are suggestions that quotations are being shaded by those anxious to keep up mill activity. Makers of boiler tubes are heavily

committed and are not anxious for additional business at present prices. Discounts are given on page 1039.

Bolts and Nuts.—There is a good business being done, but it is chiefly in specifications on orders placed at lower prices than now prevail, and current quotations have little basis in sales. Discounts are given on page 1039.

Rivets.—Advanced quotations recently announced by large producers still are more of an asking than of a selling basis. Some makers are down to the old level of $3 base per 100 lbs. for heavy structural and $3.10 for large boiler rivets, and not much business yet has been done above these levels. Prices and discounts are given on page 1039.

Steel Skelp.—Increased supplies of steel are telling on the strength of the market. While boiler tube skelp, which is not desirable business with a good many producers, commands as much as 2.25c., the prevailing market on pipe skelp is 2c. The demand still is fairly active.

Sheets.—Unfilled obligations of makers assure well maintained mill operations over the remainder of the year, but new demands are considerably less urgent than they have been and the explanation probably is to be found in a softer market in sheet bars and a definitely weaker pig iron market. Buyers no longer fear higher prices, as they did when pig iron was up around $34 and sheet bars were priced above $40. Moreover, they have not found it hard to interest some mills in orders without climbing to the extreme prices recently asked. The argument is made that No. 28 gage black sheets cost about 3.60c. to make on $40-sheet bars, but buyers are plainly skeptical and consequently cautious. An accident to the blooming mill engine at Farrell, Pa., works, Carnegie Steel Co., will deprive nearby plants of the American Sheet & Tin Plate Co. of sheet bar supplies expected as a result of the resumption of the former for from four to six weeks. Prices are given on page 1039.

Tin Plate.—It is the quiet season, but at least there is as much business as there ever is at this time of the year and sales are effected without trouble or the necessity of shading prices. The American Sheet & Tin Plate Co. still is silent as to its prices on first quarter and first half of 1923 contracts. An announcement is expected during the first week of November.

Cold-Finished Steel Bars and Shafting.—Business still is good and recent prices are well maintained. Expectations of agricultural implement business over the remainder of the year are slight, but the automotive, railroad equipment and machine tool industries are steady buyers. Most makers here have orders sufficient to keep them busy over the remainder of the year. The carload price on rolled, drawn and turned bars remains at 2.50c., base, Pittsburgh, and on ground shafting 2.90c., f.o.b. mill.

Hot-Rolled Flats.—New business is lighter in most products under this head, but the mills are well booked over the remainder of the year and are not so eager for more business as to be willing to consider lower prices. The market is firm at 2.90c. to 3c., base, Pittsburgh, for broad and narrow stock, where the bookings are heaviest, but rather easy on the intermediate widths.

Cold-Rolled Strips.—The market is holding at 4.50c., base, Pittsburgh, with buyers specifying well against contracts, but not entering new orders with as much freedom as they did a short time ago.

Rail Fastenings.—Railroads tributary to Pittsburgh have generally entered orders against their early 1923 requirements and current demands are moderate. Prices now quoted are generally above those at which business now on makers' books was taken. Prices are given on page 1039.

Coke and Coal.—The market is off another dollar per ton on coke since a week ago, and is not especially strong at the lower level. Blast furnaces running on Connellsville coke lately have been getting more than their requirements, and have been more sparing buyers, this having had the effect of making producers a little more anxious for business. While there have been sales of standard furnace coke as high as $11 per net ton at oven, on both spot and contract sales, the market during the past few days has been at $10 for high grade fuel, while coke which the furnaces use only when forced to has been available from $9.50 down to as low as $8.50. An effort has been made on the part of some furnace interests to line up their requirements for the remainder of the year, but little business of this sort has materialized because producers believe they should have $10, while furnace interests say that $8 is all they should pay in order to meet the competition now existing in pig iron from steel companies. On the present basis of coal, the argument is with the blast furnace interests, because with coking coal at $4 the cost of producing a ton of coke on the basis of one and one-half tons of coal per ton of coke and $1 for conversion, this being high because of reduced operations, the margin for the producer at $8 for the coke would appear to be wide. Producers are, however, figuring on considerable irregularity as to both labor and car supplies for the present. Foundry coke also is down $1 per ton, now being quotable at from $12 to $13 per net ton, ovens. The coal market has been depressed more through a lack of demand than because of large production. Buyers seem to have swung into line generally with Secretary Hoover's suggestions to refrain from buying from stock until the lake requirements were satisfied, and since lake buying lately has been checked by congestions, it has been hard to move the production. Mine run steam coal now is priced anywhere from $3.25 to $3.75, with Panhandle operators asking $4. By-product and gas coal, mine run grade, ranges from $4 to $5, but generally is selling from $4 to $4.50.

Old Material.—The market here for heavy melting steel still is extremely dull and rather soft, as is indicated by the fact that in the face of bids of $22.50, Youngstown, by dealers short on sales at that point, local melters have been offered tonnages at low as $21.50. This, however, is probably as low as any dealer would go except possibly on a distress tonnage or on a consignment which had to be sold quickly to save demurrage charges. The market shows no weakness on special grades such as railroad couplers, knuckles and springs, one Pittsburgh district steel company recently having bought about 15,000 tons of such material and paying $25 per gross ton delivered. On this basis, heavy melting steel should be worth about $23, but there is not a mill in the Pittsburgh area that will pay that much to-day. The leading independent here is out of the market and states that it has enough scrap to last until spring. The Carnegie Steel Co. also remains out of the market. Dealers with yard stocks are looking for these interests to buy against winter needs before long and to be able to obtain the prices they are asking, these being well above the current local market on heavy melting grade. Blast furnace grades are slightly easier.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$21.50 to	$22.00
No. 1 cast, cupola size	24.00 to	25.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	22.00 to	22.50
Compressed sheet steel	19.50 to	20.00
Bundled sheet sides and ends	17.00 to	18.00
Railroad knuckles and couplers	24.50 to	25.00
Railroad coil and leaf springs	24.50 to	25.00
Low phosphorus standard bloom and billet ends	25.00 to	26.00
Low phosphorus, plates and other grades	24.00 to	25.00
Railroad malleable	22.00 to	22.50
Iron car axles	34.00 to	35.00
Locomotive axles, steel	27.00 to	28.00
Steel car axles	24.00 to	25.00
Cast iron wheels	25.00 to	25.50
Rolled steel wheels	24.00 to	24.50
Machine shop turnings	16.00 to	16.50
Heavy steel axle turnings	18.00 to	18.50
Short shoveling turnings	18.00 to	18.50
Cast iron borings	18.50 to	19.00
Heavy breakable cast	21.00 to	21.50
Stove plate	18.50 to	19.00
Sheet bar crop ends	24.00 to	25.00
No. 1 railroad wrought	20.00 to	20.50

Chicago

Selling by Brokers Weakens Pig Iron Market —Production Limited

CHICAGO, Oct. 17.—Transportation continues to limit mill production. Car supply has improved sufficiently to permit producers to dispose of tonnage which had been piled, but no steps have been taken to increase output, as the mills are adhering to a rigid policy of rolling no more than they can ship. While steel output remains unchanged, merchant pig iron production has been increased through the going in of a third Iroquois furnace.

Demand for steel is still of large proportions, and there is no doubt that local mills could operate at capacity if transportation conditions permitted. There is a decreasing disposition on the part of buyers, however, to pay premium prices for prompt steel. In fact, many dependent on local mills prefer to wait for regular deliveries against the contracts, despite the fact that by doing so they are forced to curtail the operations of their plants. Whether Chicago mills will be able to increase production above the present average of 70 per cent is becoming more doubtful as colder weather approaches. Improvement in transportation has been exceedingly slow and such gains as are made are likely to be more than balanced by the decreased efficiency of the railroad which always follows the advent of low temperatures. It seems probable, therefore, that car shortage will prove a limiting factor on industrial activity for several months.

The leading steel interest continues to take business for indefinite delivery, but the foremost independent has not yet opened its books for first quarter. It expects to be ready to take business for that quarter, however, by the first of next month.

Ferroalloys.—The market is quiet and unchanged. A domestic producer of spiegeleisen has reduced its price to $38, Eastern furnace, to meet foreign competition.

We quote 80 per cent ferromanganese, $108.66, delivered; 50 per cent ferrosilicon, $65 delivered (nominal); spiegeleisen, 18 to 22 per cent, $47 to $48, delivered.

Pig Iron.—A steel works stack which makes merchant iron at intervals has sold several thousand tons to brokers, who are offering it at $31, base, furnace, thereby depressing the market a dollar. While this decline has frightened some buyers out of the market, there is still a fair amount of activity, consisting largely of purchases ranging from carloads up to a few hundred tons. In other words, buying is of a hand-to-mouth character, but it is apparent that a considerable number of melters are in immediate need of iron. A recent canvass by a broker which brought out replies from 138 melters in this territory showed that 31 per cent had less than two months' supply of iron on yard and under contract, 60 per cent had less than three months' supply and 77 per cent less than four months' supply. A Wisconsin motor company has closed for 1000 tons of foundry for delivery over the rest of the year. A local jobbing foundry has bought a like tonnage, while a Milwaukee melter has purchased 500 tons of malleable. A Michigan auto manufacturer is inquiring for 1500 tons of 14 to 16 per cent Bessemer ferrosilicon. A railroad car manufacturer and a wire maker have each purchased several thousand tons of basic. Car supply is somewhat better at local furnaces, although still decidedly unsatisfactory. An Iroquois furnace which had been banked for a considerable period has resumed production. Of the 10 merchant stacks represented by the leading Northern merchant, seven are now in blast, namely, three Iroquois, two Federal, one Mayville and the Zenith furnace. Shipments from Southern furnaces are still slow in coming through and new sales of Southern iron are few. However, 100 tons was sold to a melter in this district for delivery over the remainder of the year at $27, base, Birmingham. The market appears to range from $27 to $28, Birmingham. Notwithstanding a recent sale of foreign low phosphorus at a concession, several hundred tons of copper free domestic material has been sold to a melter in Chicago territory at $38, Valley furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	32.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	31.00
Northern high phos.	31.00
Southern No. 2	$33.00 to 34.00
Malleable, not over 2.25 sil.	31.00
Basic	31.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	46.29

Plates.—Railroad car buying is still the feature of the market. Active inquiries from Western roads total 9500 cars, which, if they are all placed, will bring fully 150,000 tons of steel to local mills. One local producer continues to quote 2.10c., Chicago, on plates for indefinite delivery, while another mill is offering fairly early shipment at 2.30c., Chicago. Buyers are showing a decreasing inclination to pay premium prices to secure deliveries, preferring to curtail operations pending improved shipments from local mills. This seems to explain why the car builders are not running full notwithstanding the fact that they have several months' work ahead and are being pressed by the railroads for deliveries. The Sinclair Oil Co. has withdrawn an inquiry for 10 80,000-barrel oil storage tanks. Under mill quotation, quote 2.10c. to 2.30c.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Bars.—Demand for soft steel bars is unabated and comes from practically all sources except the farm implement makers, who expect a dull manufacturing season. Automobile plants, on the other hand, are not only maintaining their high rate of production, but contemplate increasing their capacity. The railroads continue to buy a considerable tonnage of bars, as well as plates and shapes, for car repair work to be done by their own forces. While buying is still in good volume, users show an increased willingness to wait for deliveries from local mills rather than to pay higher prices for prompt shipment. The bulk of new business in soft steel bars appears to be moving at 2c. to 2.10c., Chicago. Inquiry for bar iron is more active than for some time. One Western railroad is in the market for 500 tons and another for 300 tons, and there are numerous smaller tonnages pending. Buying of this product, however, is by no means proportionate to purchases of soft steel. Hard steel bars are still available at 2c., mill. New business is about equal to production, which is on a double turn basis.

Mill prices are: Mild steel bars, 2c. to 2.10c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Rails and Track Supplies.—It now appears that fully 650,000 tons of rails and over 200,000 tons of track supplies were placed with local mills before the recent price advances. The railroads are now fairly well covered for the first half of next year, although they probably still have a considerable quantity of tie plates, bolts and spikes to place. Light rails are in better demand than for a year, due, no doubt, to the resumption of operations at the coal mines. In September, the local mill booked as much tonnage as it could roll, and orders so far this month are equally as heavy.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—Not much progress has been made toward increased production because of the car shortage which is limiting the supply of coal and steel delivered to the mills. The leading interest is booked ahead from eight to 12 weeks and is, therefore, not taking on much new business, although demand is still active. There is a growing feeling in the market that prices have reached the peak, but, on the other hand, no early decline is looked for in view of the probability that transportation will restrict production for many weeks. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1039.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bolts and Nuts.—The bulk of current business is going at the September discounts, although some sellers continue to quote the new prices. Specifications thus far this quarter have been surprisingly good, being fully equal to production, which averages about 75 per cent. Bolt and nut operations would probably be better than that, but for slow deliveries from the steel mills.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Sheets.—Demand for early deliveries is less active, but inquiries for first quarter are commencing to appear in fair volume. The local independent will probably open its books for that quarter the last of this month or early in November.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—There has been a noticeable decline in new inquiries of size, but sellers report no abatement in orders for small tonnages. Deliveries of steel from the mills are steadily improving. Warehouse prices remain firm at 2.50c. The general contract for the Spavinaw water project, Tulsa, Okla., has been awarded to the Walbridge-Aldinger Co., Detroit. A sub-contract has been let to the Lockjoint Pipe Co., Ampere, N. J., which will purchase the reinforcing bars required, amounting to about 7000 tons. Recent lettings include:

Highway work in Iowa, 350 tons, to Paul J. Kalman Co.
Warehouse, Kohler, Wis., 200 tons, to Concrete Engineering Co.
Sterling Morton High School, Cicero, Ill., 110 tons, to American System of Reinforcing.

Pending work includes:

Knights of Pythias, lodge and office building, South Bend, Ind., 150 tons.

Structural Material.—Activity in the fabricating field is on the decline, both lettings and inquiries being less numerous. The largest structural contract of the week was let to the American Bridge Co. It covers the Wrigley Building Annex, Chicago, and will probably involve about 5000 tons, although the award was made on a pound basis, the plans not having been completed. While local mills are still hampered by car shortage in making shipments, buyers are showing little inclination to pay premiums for deliveries. Most mill business placed in this district is going at 2.10c. to 2.20c., Chicago.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Steel Castings.—Not much new business has been closed since the advanced prices went into effect, but the castings for a considerable number of cars are still to be bought. This holds true of the 5150 cars ordered by the Santa Fe and the 3300 cars placed by the St. Louis & San Francisco. The market is firm, and further advances in some classes of castings, notably car castings, are expected.

Cast Iron Pipe.—The market is unusually quiet. The undiminished uncertainty of the transportation situation is doubtless discouraging the appearance of new inquiries. Chicago has awarded 730 tons of 8 to 12-in. to the United States Cast Iron Pipe & Foundry Co. The Lynchburg Foundry Co. will furnish 90 tons of 30-in. for Detroit. Westmont, Ill., will take bids on 700 tons Oct. 18. Hamilton, Mo., will receive figures to-day on 300 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $57.20; 6-in. and above, $51.20 to $53.20; class A and gas pipe, $3 extra.

Warehouse Prices.—Local jobbers have advanced hoops $5 a ton to $4.15 per 100 lb.; structural and boiler rivets, $2 a ton to $3.75 and $3.85 per 100 lb., respectively; plain wire and wire nails, 10c. per 100 lb. to $3.30 and $3.45, respectively, and cement coated nails, 15c. per keg to $2.90. Special H structural sections have been advanced from $2.90 to $3.15 per 100 lb. Plates, shapes, bars and sheets remain unchanged, and no advances are expected. Business is in good volume, although not so heavy as in recent weeks.

Old Material.—The market is quiet and prices are practically stationary, with both dealers and users marking time. While there are as yet no evidences of weakness, the feeling is growing among buyers and sellers alike that prices have reached the peak. Railroad offerings are still limited, but if present mild weather continues, scrap accumulations by the carriers may assume considerable proportions. Scrap held on speculation is again being offered, no doubt, for the reason that hope for further advances has been abandoned. Some difficulty has been encountered in moving country scrap, however, because of car shortage. Nevertheless, malleable was recently shipped to this market all the way from Roanoke, Va., and scrap of various grades has been offered from points as far west as Nebraska. Consumer buying is limited largely to small lots. Moderate purchases of heavy melting have been made by a leading steel works, but iron mill grades are inactive. The important malleable users appear to be fairly well covered on contract for the remainder of the quarter. Sales to gray iron foundries are confined largely to carload lots. The Rock Island has issued a list of about 1500 tons; the Monon offers 500 tons. The Ordnance Department is taking bids on 750 tons of hydraulic pumps, located at the local Government warehouse, which will be sold as machinery cast.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$25.00 to $25.50
Cast iron car wheels	25.00 to 25.50
Relaying rails	27.50 to 32.50
Rolled or forged steel car wheels	23.50 to 24.00
Rails for rolling	20.50 to 21.00
Steel rails, less than 3 ft.	22.00 to 22.50
Heavy melting steel	18.50 to 19.00
Frogs, switches and guards cut apart	18.50 to 19.00
Shoveling steel	18.25 to 18.75
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheet	15.50 to 16.00
Axle turnings	16.00 to 16.50
Per Net Ton	
Iron angles and splice bars	23.00 to 23.50
Steel angle bars	18.50 to 19.00
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	25.50 to 26.00
Steel car axles	20.00 to 20.50
No. 1 busheling	15.50 to 16.00
No. 2 busheling	10.50 to 11.00
Cut forge	17.25 to 17.75
Pipe and flues	12.50 to 13.00
No. 1 railroad wrought	17.75 to 18.25
No. 2 railroad wrought	17.25 to 17.75
Steel knuckles and couplers	21.00 to 21.50
Coil springs	22.00 to 22.50
No. 1 machinery cast	21.00 to 21.50
No. 1 railroad cast	19.50 to 20.00
Low phos. punchings	17.50 to 18.00
Locomotive tires, smooth	18.50 to 19.00
Machine shop turnings	11.00 to 11.50
Cast borings	13.50 to 14.00
Stove plate	17.50 to 18.00
Grate bars	17.50 to 18.00
Brake shoes	17.50 to 18.00
Railroad malleable	22.00 to 22.50
Agricultural malleable	22.00 to 22.50

New York

Large Inquiries for Bars and Wire Mesh—Pig Iron Dull

NEW YORK, Oct. 17.—The week has been one of extreme quiet in pig iron, and of inquiries amounting to about 10,000 tons reported last week, no tonnage of importance has been contracted for. The attitude of buyers is one of waiting, evidently with the expectation of lower prices in harmony with somewhat easier conditions in transportation and lower quotations on coke. Although the market is lacking in firmness, quotations in eastern Pennsylvania remain about the same as last week. It is understood that the new shipment of malleable iron coming from Duluth has been sold. Reports from Buffalo indicate a softening tendency in that market, with prices about $1 lower and some resale iron being disposed of at $29.50. Foreign iron has not been in evidence to any considerable extent during the past few days and quotations on it are unchanged.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$35.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	34.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	33.27
Buffalo, sil. 1.75 to 2.25	35.91
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—Business in ferromanganese is confined to carload lots of the British product, which are being sold at the regular quotation of $67.50, c.i.f. New demand is exceedingly light, but specifications on contract, even with the duty in effect, are reported urgent. Nothing is heard of offerings of domestic alloy. Demand for spiegeleisen, both foreign and domestic, is confined to small lots. Quotations for the domestic 20 per cent alloy range from $38 to $39, furnace, and for the foreign $38, duty paid. No activity in manganese ore is reported and quotations are nominal. The 50 per cent ferrosilicon market is also quiet at higher quotations, the domestic alloy being the only one offered. Business in ferrochromium is fair and prices are a little stiffer. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace or duty paid	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$70.00 to $75.00
Ferrosilicon, 14 to 16 per cent, delivered, per gross ton	$40.00 to $45.00
Ferrotungsten, per lb. of contained metal,	70c. to 85c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $7.75
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$17.50 to $18.25
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—Private purchasing is keeping up to an unusual extent, considering the seasonal dullness which generally ensues. Prices are firm and deliveries on 6-in. and smaller sizes are, as a rule, still extended. The tender of the City of Boston for 450 tons of 30-in. pipe, which opened Oct. 11, was awarded to the Warren Foundry & Pipe Co., Philipsburg, N. J. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market also continues to report unprecedented activity, dealers being active in purchases to fill in on sizes. We quote per net ton, delivered New York, discounts of both Southern and Northern makers as follows: 2 to 6-in. standard, 25 to 30 per cent off list; heavy, 34 and 35 per cent off list.

Warehouse Business.—Demand in practically all lines is reported as unusually good, particularly among warehouses handling structural material. Besides the usual customers, there are evidently a number who, because of the car situation, are unable to receive satisfactory mill delivery. The car shortage is hampering delivery and affecting stocks in consequence. In this respect it is felt that a shortage of black and galvanized sheets may be seen shortly, although at present the wide range of prices that has prevailed for some time still exists. Black and galvanized sheets, No. 28 gage, are still quotable at from 4.50c. to 4.90c. per lb. and 5.50c. and 5.90c. per lb., respectively, with reported sales from time to time at even lower prices. On the whole, however, it is believed that the market is stiffening slowly. Dealers in wrought iron and steel pipe report continued good business and prices firm. Brass and copper warehouses state that business is fair with no change in quotations out of stock since Sept. 28. We quote prices on page 1056.

High-Speed Steel.—The market shows about the usual activity. Much of the present dullness is attributed by producers to the uncertainty prevailing among consumers as to the trend of future business. Quotations are still from 75c. to 80c. per lb. on 18 per cent tungsten high-speed steel, with special brands of some companies ranging up to 90c. per lb.

Finished Iron and Steel.—The present steel price situation has both buyers and sellers guessing as to the future. Sellers say that buyers are apparently satisfied with a 2c. level on plates, shapes and bars, and the trend of the market is toward that level, although all mills have not yet gone that low. Bars are now 2c. to 2.10c., Pittsburgh, the lower price applying on especially desirable specifications, particularly concrete reinforcing bars in large tonnages, but for delivery within two or three weeks it is difficult to buy below 2.10c. The range on structural shapes is also 2c. to 2.10c., Pittsburgh, the lower price being given when delivery requirements are not too exacting or if the tonnage is attractive. Plates are slightly higher, 2.10c. to 2.15c., Pittsburgh, being the level at which most of the business is going. Reports are out that 2c., Pittsburgh, has been quoted by an Eastern mill, but this is not confirmed. A Pittsburgh mill says that it is able to get 2.25c. in the Pittsburgh district, but that competition in the East makes it impossible to get above 2.10c. or 2.15c. The large inquiries for bars are mostly for concrete construction. The Lock Joint Pipe Co. is inquiring for 3500 tons of bars and 2600 tons of wire mesh for a water works plant at Tulsa, Okla. This is the largest inquiry for wire mesh quoted on in this market in a considerable time. About 1500 tons of bars are required for a flour mill at Buffalo for the Pillsbury Flour Mills Co., and various jobs of the New Jersey State Highway Commission require about 1000 tons, some of which has been let. In plates large inquiries are lacking, and there is also a falling off in the number of structural jobs, it being between seasons, too late for fall work and too early for work that is to be begun in the spring. Nevertheless, there are several sizable jobs up for figures, including about 10,000 tons for the new Equitable Building in the Pennsylvania Station zone, New York, on which plans will be issued shortly; 6000 tons for car sheds for the Interborough Rapid Transit Co., and 2500 tons for bridges for the Baltimore & Ohio Railroad. In tin plate there is a fair degree of activity both for export and domestic. In addition to the Standard Oil inquiry for 150,000 base boxes, the Texas Co. is in the market for 50,000 boxes. Consumers who have steel bought are pressing for deliveries, which are delayed, especially from Pittsburgh and Youngstown mills, by the car shortage. The demand for butt weld pipe is particularly active, but lap weld is fairly easy. Wire products are also in demand, nails in particular. A shortage of wire drawers at wire mills is restricting output in some instances to about 60 per cent. The sheet situation appears particularly firm, some mills being sold up for the remainder of the year, and mills in this position are little disposed to consider business at less than 2.75c. for blue annealed, 3.75c. for black and 4.75c. for galvanized, all base Pittsburgh, but it is apparent that these prices are not being paid in every instance. Bar iron is unchanged at 2.15c. to 2.25c.,

Pittsburgh, but it reported that these prices are not as firm as they were a few weeks ago. Export prices continue below domestic prices. A small tonnage of bars for Japan is reported to have been taken by a leading mill at a price which figured back to 1.70c., Pittsburgh.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery, soft steel bars, 2.34c.; structural shapes and steel plates, 2.34c. to 2.44c.; for delivery in a number of weeks, soft steel bars and plain structural material, 2.34c. to 2.49c.; steel plates, 2.34c. to 2.59c.; bar iron, 2.49c. to 2.59c.

Coke.—Prices of coke are somewhat lower, and show a wide variation, foundry grades being quoted all the way from $12.75 to $14, and furnace grades from $10 to $11. By-product coke is still quoted at $14, seaboard. There has been a large amount of contracting for by-product coke for distribution in New England, with the usual provision for prices to be determined by the going market at time of delivery. One blast furnace whose owners would like to place it in operation has been unable to obtain from the railroad serving it a promise of regular delivery of coke, although the use of only 50 cars would be needed to meet the requirements.

Old Material.—There is considerably less activity and prices exhibit a slight tendency toward weakness. The railroad embargoes are, as a rule, charged with the present slackening. Brokers are still buying to fill contracts, but new buying by mills is reported at a minimum. Milton and Columbia are out of the market on specification pipe and Lebanon has dropped its offering price from $17 per ton down to $16. Bethlehem is stated to be no longer buying, but shipments are still being made on contracts. With Mahwah, N. J., out of the market on stove plate and $16 per ton being paid for shipment to Harrisburg, which takes a $3.78 freight rate, this item is showing some weakness. A shipment of heavy melting steel to Johnstown is stated to have been made by one dealer at $19 per ton, the freight rate being $4.79, and a broker in New York reports a shipment of steel from a point in New England to Monessen at $21 per ton, delivered. The market on heavy melting steel is still quotable at $14 to $14.50 per ton, but the mills are stated to be increasingly particular as to quality.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$14.00 to $14.50
Steel rails, short lengths, or equivalent	15.00 to 15.50
Rails for rolling	15.75 to 16.25
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	14.50 to 15.00
Forge fire	11.50 to 12.00
No. 1 yard wrought, long	14.00 to 14.50
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	12.25 to 12.75
Mixed borings and turnings	12.25 to 12.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25 to 13.25
Stove plate	14.00 to 14.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	14.50 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.50 to 18.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

The economic importance of safety is to be discussed at the meeting in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, on the evening of Oct. 20 by the American Society of Safety Engineers. An attempt will be made to secure the records of accidents in a given plant ten years ago and to-day, thus to get a comparison as to the number and severity of casualties and the saving in dollars and cents.

Work is being done at Pittsburgh by the U. S. Bureau of Mines on a portable method for determining the dissolved gases in boiler feed water, especially hydrogen. Some boiler feed waters have been found to contain more than 30 per cent hydrogen.

Buffalo

Pig Iron Prices Lower and Demand Limited—Finished Materials Dull

BUFFALO, Oct. 17.—Sales of No. 2 plain pig iron at $31 are more frequent and one furnace announces this figure, although it is not able to take business freely. This furnace has sold 1000 tons made up of various small transactions. Inquiry is livelier, one proposition being considered by two furnaces involves 5000 tons, others ranging from 200 to 500-ton lots, consisting of both malleable and foundry iron. The Donner Steel Co., which has been out of the pig iron field for practically three months, expects to consider foundry iron business soon. Reports of $30.50 being made on No. 2 plain iron by furnaces are not confirmed, but it is understood brokers are selling at $29.50. The Wickwire Steel Co. is relining a stack and expects to blow it in when this work is finished. The basic iron situation is unchanged, no sales having been made that would determine a price other than nominal.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$33.00
No. 2X foundry, 2.25 to 2.75 sil.	32.00
No. 2 plain, 1.75 to 2.25 sil.	31.00
Basic	31.00
Malleable	31.00
Lake Superior charcoal	34.28

Finished Iron and Steel.—Finished material sellers in some quarters are finding a situation where buyers are not as interested in placing orders as they were. I is regarded as indicative of a belief that prices are gradually reaching a more stabilized basis and that no advances are likely at the present time. Prices on bars, shapes and plates are generally firm, 2c. on bars, 2c. to 2.10c. on shapes and 2c. to 2.25c. on plates are virtually the uniform quotations. Sheet business is brisk, but inquiry is somewhat spasmodic; one sheet-maker has sufficient business to warrant full operation when labor is available. A new list of extras on sheet finishes ranging from 5 to 20c. per 100 lb. has been put into effect. No new large structural enterprises have appeared and the general run of projects is for less than 100 tons.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Warehouse Business.—Demand for warehouse products is about evenly distributed, with indications pointing to a good movement of material for the next three or four months. Prices are regarded as stabilized. Haste to clean up, pending structural propositions, is reflected in the increased demand for structural shapes.

Coke.—A price of $14, f.o.b. ovens, is quoted for best grades with a freight rate of $3.28 to Buffalo.

Old Material.—Sales of heavy melting steel have been made at prices ranging from $20.50 to $21, and about 2000 tons has been involved in each transaction. Only one mill is inclined to pay in excess of $20 and something of a lull has developed because dealers are not willing to release material at less than $20.50. Scrap production is limited; railroad embargoes and car shortages seriously affect lists. All dealers have fairly lively demand for turnings and borings, low phosphorus, cast scrap and car wheels. Heavy melting steel, $20 to $21.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.50 to 18.00
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	17.00 to 18.00
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

Boston

Large Tonnage of Scotch Iron Received — Active Selling of Duluth Iron

BOSTON, Oct. 17.—During the week ending with Saturday last, four steamers with a total of 14,750 tons of Scotch pig iron arrived at this port, the largest amount recorded in any similar period during the present importation movement. There were two 5000 ton lots, one 3800 ton and one 900 ton. A part of the 5000 ton lots will be unloaded at Philadelphia. Credit for the showing made by domestic is largely due to the activity of Duluth iron at $30.50 base, Buffalo, this iron running low in phosphorus and presumably to be mixed with high phosphorus foreign stock. However, sales include several hundred tons of Buffalo iron, fourth and first quarters, at $32, furnace, for No. 2 plain, $33 for No. 2X and $34 for No. 1X; small tonnages of Alabama spot at $38 base, Providence, R. I.; small tonnages of western Pennsylvania at $32.50, furnace, for No. 2X; and small tonnages of eastern Pennsylvania at $31 to $32, furnace base; as well as unimportant tonnages of resale at premiums. Domestic iron quotations appear steadier. Foreign iron is firmer, but no higher. Sales included a small tonnage of spot No. 3 Scotch at $33.50 dock, Boston, and later deliveries at $31 to $32, duty paid. The extreme range on No. 3 Scotch offerings is $28 to $33 on dock. English iron is offered at $28 to $30, and Continental at around $28 on dock, duty paid. The Worthington Pump & Machinery Corporation inquiry for 400 tons each of No. 2 plain, No. 2X and No. 1X and 50 tons high silicon and 50 tons charcoal iron, Holyoke and East Cambridge, Mass., deliveries, has been partly covered, foreign iron being taken. A New Hampshire machinery builder bought 200 tons of foreign iron. Three or four 500-ton lots of iron are expected to close this week, the inquiries being of a private nature, and details lacking.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$35.65 to $37.65
East. Penn., sil. 1.75 to 2.25	34.65 to 36.65
Buffalo, sil. 2.25 to 2.75	37.91 to 38.41
Buffalo, sil. 1.75 to 2.25	36.91 to 37.91
Alabama, sil. 2.25 to 2.75	37.60 to 38.10
Alabama, sil. 1.75 to 2.25	37.10 to 37.60
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Finished Material.—A large tonnage of girder rails for 1923 delivery was placed the past week by New England trolley companies, the Boston Elevated Railway Co., the Eastern Massachusetts Street Railway Co., the Worcester Consolidated Street Railway Co., and the Springfield Street Railway Co. being the buyers. The United Electric Railways of Providence, R. I., has not covered its requirements. Aside from rails, the market for finished materials is comparatively quiet, buying being limited to small tonnages in each department. Prices on bars and bolts and nuts hold well, but the range on plates is widening, the spread now being 2c. to 2.25c., Pittsburgh. The Boston Bridge Works, Inc., was awarded 125 tons of structural steel for a baseball cage at Andover, Mass., and the New England Structural Co. 100 tons for a Hyde Park, Boston, engine room extension. Notwithstanding the falling off in structural steel prospects, mill prices remain unchanged. New England steel mills are running full. The Massachusetts plants of the Wickwire-Spencer Steel Corporation are employing more than 3200 workers.

Warehouse Business.—Sales of iron and steel are keeping pace with those for the corresponding period last month. Local stocks are in good condition and prompt deliveries are being made by warehouse interests. Bolts and nuts are more active on talk of an advance in prices. Cut nails have been marked up 10c. per keg, hard steel nails as much, while galvanized nails are 25c. higher. Proof coil, self colored chain has advanced 1c. per lb., placing 3/16-in. stock at 14½c. per lb. Weights are $5 a ton higher, 5 lb. and heavier now being $53 a ton from foundry stocks.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—Activity in the foundry coke market the past week centered largely in contracts for the first half of 1923, both the New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., having opened their books for such business. The former company is accepting business on a basis of price ruling date of shipment, while the Providence concern is booking orders subject to price ruling on the first of the month prior to shipments. Aggregate tonnage booked runs well up into five figures. The going contract price on foundry coke made by these companies is $16.50, delivered within the $3.10 local freight zone, and the spot price $19.50. Although Connellsville foundry cokes are cheaper, sales in this territory the past week were practically nil. A shipper of Alabama foundry coke has sold 2300 tons to the city of Boston. During the week 4400 tons of English coke arrived at this port, all of which was previously sold.

Old Material.—The withdrawal of additional Pennsylvania buyers from this market has materially slowed up business in heavy melting steel, with resulting softness in prices. Boring and turning values continue to hold well, but those on other materials have an easier tendency in sympathy with heavy melting steel. The best some brokers can offer for heavy melting steel is $14, whereas a week ago they paid better than $15, shipping point. The same firms will pay $2 more for railroad wrought than for heavy melting steel. Reductions by the trade in general, however, are much more modified, but the spread in prices for the moment is wider than usual. Foundries continue an unimportant factor in the machinery cast market, yet a considerable additional tonnage of No. 2 cast has been moved the past week, manufacturers paying $21 delivered a Massachusetts point. No. 1 cast sold in a small way at $22 and $23, delivered. Sales of material for consumption in this territory included round tonnages of No. 1 yard wrought at $19 and $19.50 delivered in Massachusetts.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	17.50 to 18.00
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.00 to $16.00
No. 1 railroad wrought	15.50 to 16.50
No. y yard wrought	13.50 to 14.50
Wrought pipe (1 in. in diam., over 2 ft. long)	12.00 to 12.50
Machine-shop turnings	12.00 to 12.50
Cast iron borings, rolling mill	14.50 to 15.50
Cast iron borings, chemical	17.50 to 18.00
Blast furnace borings and turnings	11.50 to 12.00
Forged scrap and bundled skeleton	11.50 to 12.00
Street car axles	23.00 to 24.00
Street car wheels	18.00 to 18.50
Shafting	18.00 to 19.50
Rails for rolling	16.50 to 17.00

About 60 men at the car repair shops at the plant of the American Car & Foundry Co., Wilmington, Del., declared a strike, Oct. 9, with complaint that the works were being used for "farm out" repairs on freight cars for the Baltimore & Ohio Railroad Co., with lower wage scale than that paid at the railroad car shops for such work. The men ask that the wages be advanced to the basis noted and that employees at the local plant be granted the same working conditions and privileges as received by the railroad shop workers.

Cleveland

Pig Iron Shows Further Recession and Buying Is Still Light

CLEVELAND, Oct. 17—The transportation situation is still very bad in respect to shipments from Pittsburgh and Youngstown mills, apparently showing no improvement over a week ago, but the Pennsylvania Railroad has lifted its embargo on west bound freight from Pittsburgh, which will tend to relieve the situation. Johnstown, Pa., and Buffalo mills are able to keep steel moving fairly well to Ohio points. Two additional blast furnaces in this territory were blown in this week. The Bourne-Fuller Co. started up its Upson stack in Cleveland, and the Cherry Valley furnace of the Hanna Furnace Co., at Leetonia, Ohio, went in blast.

Iron Ore.—The car supply is holding up fairly well for the movement of ore from Lake Erie docks, so that shippers are experiencing little delay. During September some of the ore firms fell behind on shipping schedules and they are endeavoring to catch up with their schedules this month. Consequently, the October movement is expected to be about as heavy as during September, or close to 7,000,000 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—Prices have further declined on foundry and malleable iron about 50c. a ton, and some furnaces have made larger reductions to bring their prices more in line with the present market. Buying is light, although sales were heavier during the past week than in the preceding week. One lake furnace is now quoting foundry iron at $31.50 to $32.50 as compared with $32 and $33 of last week and reports sales aggregating 5,000 tons, including an 800-ton lot of malleable iron which was purchased by a northern Ohio consumer at $32. A Cleveland producer is now quoting foundry iron at $33, Valley furnace for Cleveland and outside delivery and sold a 1,000-ton lot for shipment to the Pittsburgh district at that price, which is equivalent to about $32 at furnace. Another local furnace is quoting foundry iron at $33 for outside shipment and $34 for local delivery. However, foundry iron is being freely offered by outside furnaces at $34, delivered Cleveland, and this price can probably be shaded 50c. a ton. Resale foundry iron has appeared in Buffalo at $29.50 and this can be delivered to Valley consumers at $31.02. Another cargo of 5,000-tons of malleable iron is on its way from Duluth to Buffalo for Eastern points. A sales of 400 tons of foundry iron for the first quarter has been made by a lake furnace at $31.50 and a number of other inquiries, including one for 800 tons, are pending. However, these for the most part are regarded as market feelers. Foundries generally are looking for further price reductions and are not inclined to buy except for immediate requirements. No activity is reported in steel making iron. A Valley producer reports the sale of 800 tons of low phosphorus iron at $38 including a 500-ton lot in Chicago. A local foundry during the week purchased 500 tons of foreign low phosphorus iron. Southern iron is easier, some producers who have been quoting $30 for foundry grades having gone back to $28. Southern iron is also being offered at these prices for the first quarter. The foundry iron melt continues heavy and many consumers, including automobile foundries, are crowding furnaces for shipments.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace, nominal	$31.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$33.50 to 34.00
Southern fdy., sil. 1.75 to 2.25	33.50 to 34.00
Malleable	33.50 to 34.00
Ohio silvery, sil. 8 per cent	44.52 to 45.52
Standard low phos., Valley furnace	37.00 to 38.00

Semi-Finished Steel.—Very little inquiry is coming out for semi-finished steel, although a local mill has made small lot sales of sheet bars at $40.

Sheets.—Demand for sheets is light. Black sheets are being offered for prompt shipments at 3.50c., Pittsburgh. The minimum quotation by independent mills on blue annealed sheets is 2.50c. and on galvanized sheets 4.50c., but some mills are quoting $5 a ton higher than the above prices on all grades.

Re-Enforcing Bars.—The demand for re-inforcing bars in small lots continues heavy. Among new inquiries is one for 700 tons for a water works reservoir in Memphis, Tenn. Hard steel bars are firm at 2c. to 2.10c.

Coke.—Foundry coke shows a softer tendency and is now quoted at $13 to $14 for standard Connellsville makes. The market was fairly active during the week in small lot orders.

Bolts, Nuts and Rivets.—A fair volume of business in bolts and nuts is coming from consumers at the new prices, which are firm, and specifications on old contracts are heavy. Local manufacturers are lining stock cars with paper and using these for making shipments because of the scarcity of box cars. Some new business in good sized rivet orders is coming from railroads and from oil tank builders. The market has stiffened. The leading local producer is now quoting 3.15c. for structural and 3.25c. for boiler rivets on all new business.

Old Material.—The scrap market is in an unsettled state in respect to prices. Although there has been a further decline on a few grades, some demand for heavy melting steel for Warren delivery has caused a temporary improvement in the tone of the market. The more common quotations on heavy melting steel range from $21 to $21.50 for Valley shipment, but for selected scrap a dealer has been offered $22.50. The local market is very dull with heavy melting steel scrap around $19 having declined about 50c. a ton. However, a small lot brought $19.75. A wide price spread has also appeared on compressed steel ranging from around $17 Cleveland to $20.50 delivered Youngstown. Most dealers are reported "long" on scrap. Consequently, they are inclined to hold up prices.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.75 to $19.25
Steel rails under 3 ft	21.00 to 21.25
Steel rails, rerolling	21.00 to 21.50
Iron rails	18.00 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	20.00 to 20.50
Cast borings	15.00 to 15.25
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	14.75 to 15.00
Compressed steel	16.75 to 17.25
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	21.00 to 21.50
No. 1 busheling	14.25 to 14.50
Drop forge flashings over 10 in.	13.50 to 14.00
Drop forge flashings under 10 in.	14.00 to 14.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	13.75 to 14.00

Finished Material.—The demand for finished iron and steel has fallen off considerably and prices show an easier tendency, bringing the independent mills nearer the Steel Corporation levels. While the 2.25c. price has not entirely disappeared, steel bars are now being freely offered by independent mills at 2c. for early shipment and a Buffalo mill that can make immediate delivery at that price has become a factor in the local market. On plates 2c. to 2.10c. is commonly quoted, although some mills are still holding to 2.25c. Quotations on structural material range from 2c. to 2.10c. Two large orders for oil tanks, each requiring 3000 tons of plates, were placed during the week. One was placed by the Sinclair Oil Co. with the Chicago Bridge & Iron Co. and the other by the Gulf Refining Co. with the Kansas City Structural Co. With present Chicago mill prices on plates, Ohio tank shops buying on a Pittsburgh basis appear unable to compete with western shops buying plates in Chicago for oil tank work in the Southwest. The Peter F. Connelly Co. has been awarded the contract for lap bar pipe for the Cleveland Water Works, requiring 1700 tons of

plates. Lake ship yards are figuring on two new boat inquiries that will require 2600 tons of plates. After a brief lull in the building field, inquiries for structural material have become more active. Building work placed during the week, about to be closed and covered in new inquiries, aggregated about 15,000 tons and in addition bids will be asked for shortly for the Cleveland Public Library, requiring 4000 to 5000 tons of plain material. There is still a fair demand from the automobile field and new inquiries from this source include 900 tons of carbon and alloy spring steel.

Cincinnati

Pig Iron Prices Lower and Sales Light—Coke Quotations Decline

CINCINNATI, Oct. 16.—So far as transactions were concerned, the past week in the pig iron market might well be regarded as featureless. Sales consisted for the most part of carload lots, with an occasional order for 100 to 200 tons being booked. Inquiry also was light, melters in this district apparently having withdrawn from the market. The reason for this is largely due to the fact that iron purchased for third quarter delivery is now coming in, and the need for fill-in tonnages has been satisfied. Slight weakness is perceptible in Northern irons. Chicago, Toledo and Detroit furnaces are reported to be offering iron at $31, furnace, while southern Ohio iron can now be had from practically all sellers at $32. In the South, the situation shows little change, $27 still being the minimum price. It is noted, however, that some furnaces which had been quoting and selling at $30 have revised their ideas somewhat, and $27 to $27.50 may be regarded as the market. One Southern furnace has let it be known that it will book orders for first quarter at to-day's prices, but is not actually soliciting business. The same condition exists in the North, but no reports of first quarter buying have been made. Star silvery furnace at Jackson, is expected to blow in about the last of this month, and the Buena Vista, Va., furnace, has purchased coke, and will start shortly.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.55
Ohio silvery (nominal), 8 per cent	43.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	34.27
Basic Northern	33.27
Malleable	34.27

Warehouse.—Good business continues, and although deliveries from the mills are still slow, a slight improvement is reported. Consumers, who under normal circumstances, buy directly from the mill, are taking part of their requirements from warehouses. Good demand for reinforcing bars and shafting is noted. Prices are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3 per 100 lb.; common wire nails, $3.20 per keg, base.

Finished Material.—The market has been featureless during the week. The Big Four fourth-quarter requirements on which bids were opened Oct. 5 have not been officially awarded. Prices are firm, but delivery, not price, seems to be the major consideration on all classes of material. An advance of $5 per ton on cold-rolled flats, making the price 4.50c., instead of 4.25c., was put into effect Oct. 10 by the Steel Corporation subsidiary. Bars are quoted at from 2c. to 2.25c., the higher price being for nearby deliveries which in most cases run from six to eight weeks. Shapes, in light demand, are quoted at from 2c. to 2.15c. On plates the quotation is 2.25c., delivery promises being within four to eight weeks. Car shortage is still affecting the delivery of sheets. Prices are very firm, blue annealed being generally quoted at 2.75c., black at 3.50c., and galvanized at 4.50c. Automobile sheets are in good demand at 5c. Orders are being booked on tin plate for fourth quarter delivery, the current price being 4.75c. per box. It is expected, however, that an advance will shortly be announced. Activity in the coal mining fields is reflected in an increasing demand for light rails and the demand for wire and wire products continues fair, but here also deliveries are a deterrent factor. Few new building projects were figured on during the week, one of the largest being the L. & N. Railroad station at Knoxville, Tenn., involving 250 tons.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.40c.; No. 28 galvanized sheets, 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Tool Steel.—Buying of tool steel has been very good during the week. A price advance has been made, establishing a range of from 75c. on regular grades of high-speed steel to 90c. on special brands of some companies.

Coke.—There was fair activity in the coke market, with prices showing a softer tendency. We note a sale of 10,000 tons of furnace coke to a Northern furnace, and several of 1000 tons to furnaces now operating. Connellsville foudry coke, standard brands, is quoted at $13 to $13.50; furnace at $10.50 to $12; New River foundry ranges from $13 to $15, and Wise County $12.50 to $13.50. Wise County furnace coke is quoted at $9.50 to $10. By-product foundry coke is quoted at $11 to $12.

Old Material.—The scrap market is inactive, and a softer tone is in evidence, particularly in cast grades. Railroad offerings are fairly heavy, the Norfolk & Western and Louisville & Nashville having heavy lists out. Dealers do not expect much business until these lists are closed. Prices, while tending downward, are quotably unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $14.50
Iron rails	17.00 to 18.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rolling	18.50 to 19.00
Heavy melting steel	17.50 to 18.50
Steel rails for melting	16.00 to 17.00
Car wheels	20.00 to 21.00
Per Net Ton	
No. 1 railroad wrought	14.50 to 15.00
Cast borings	11.50 to 12.00
Steel turnings	10.50 to 11.00
Railroad cast	18.00 to 19.00
No. 1 machinery	21.00 to 21.50
Burnt scrap	12.00 to 12.50
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	14.50 to 15.50
Pipes and flues	9.00 to 9.50

St. Louis

Pig Iron Strong—Car Shortage Still Serious—Coke Is Scarce

ST. LOUIS, Oct. 17.—The market for pig iron continues strong, with Southern iron being quoted at $28 to $30, Birmingham, and Northern iron at $32, Chicago. As has been the case for several weeks past, the demand is for small quantities for immediate shipment. Melters buy iron as they need it, and want it shipped right away. Little interest is being shown in orders for the future, in the belief, perhaps, that prices may be lower. The car shortage is still serious, making it difficult to get deliveries on contracts. Melters have been calling on one another to help them out with supplies. Very little iron is coming through by all-rail route from the South, although the water and rail movement of Sloss-Sheffield iron continues regularly. Job and stove foundries are busier than a month ago. Business in stoves has been stimulated by the recent cold weather. Here, too, the car shortage is interfering with shipments. The St. Louis Coke & Chemical Co. continues to work on basic, but will shortly return to foundry iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$34.16
Northern malleable, sil. 1.75 to 2.25	34.16
Basic	34.16
Southern foundry, sil. 1.75 to 2.25	$33.17 to 35.17

Finished Iron and Steel.—Jobbers report that business is better, and they are looking to the replenishing of stocks, especially in bars, several sales of 50 to 70 tons being made during the week, with inquiries from others. Fabricators are busy, but they report that they have few inquiries, and they are looking for business for December and January. The Missouri Pacific has asked for quotations on 215 tons of reinforcing bars in stock lengths. A railroad bought 2000 charcoal iron boiler tubes. The Missouri-Kansas-Texas Railway bought five boilers for shops at Bellmead, Tex., from the Heine Boiler Co. There is a lull in the demand for sheets. The sale of two carloads of wire nails to a jobber is reported at $2.75, 5c. over the lower quotation, because of ability to guarantee deliveries.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, $\frac{7}{8}$ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—Coke is still very scarce, with the demand increasing. The Granite City producer is taking business covering the current make to take care of, as far as is possible, the needs of users in this territory. Their price is still $14 at the ovens. Connellsville coke is quoted at $14 to $15 at the ovens.

Old Material.—Railroad offerings listed last week were easily absorbed at top prices. The only additional lists before the trade this week are: Mobile & Ohio, 1900 tons; St. Louis & San Francisco, 2,000 tons, and Northern Pacific, 1100 tons. Receipts generally still are small, and consumption is increasing, having been greater during September than any month in 1922, with the prospects of even greater consumption this month. Users are inclined to hold off buying as long as possible, but it is believed that it is only a question of time when they will be in the market again for heavy supplies. The St. Louis Screw Co. and the Hemlbacher Rolling Mill have increased operations.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$21.50 to $22.00
Rails for rolling	22.00 to 22.50
Steel rails, less than 3 ft.	22.00 to 22.50
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	24.50 to 25.00
No. 1 heavy railroad melting steel	21.00 to 21.50
No. 1 heavy shoveling steel	17.50 to 18.00
Ordinary shoveling steel	17.00 to 17.50
Frogs, switches and guards cut apart	20.50 to 21.00

Per Net Ton

Heavy axles and tire turnings	11.50 to 12.00
Steel angle bars	17.00 to 17.50
Iron car axles	27.50 to 28.00
Steel car axles	20.50 to 21.00
Wrought iron bars and transoms	23.00 to 23.50
No. 1 railroad wrought	17.50 to 18.00
No. 2 railroad wrought	17.00 to 17.50
Railroad springs	21.00 to 21.50
Steel couplers and knuckles	21.00 to 21.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
No. 1 railroad cast	20.00 to 20.50
Railroad malleable	20.25 to 20.75
Machine shop turnings	9.50 to 10.00

Detroit Scrap Market

DETROIT, Oct. 16.—The acute car shortage has been reflected in the scrap market along with a slight falling off in the melting schedule in this district. The automotive industry, while still running ahead of predicted production for this time of year, has probably fallen off from 15 to 25 per cent. The following prices are on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$16.00 to $16.50
Shoveling steel	16.00 to 17.00
No. 1 machinery cast	22.00 to 24.00
Cast borings	12.50 to 14.00
Automobile cast scrap	24.00 to 26.00
Stove plate	21.00 to 23.00
Hydraulic compressed	17.00 to 18.00
Car wheels	21.00 to 22.00

Birmingham

Demand for Pig Iron Not So Active and Prices are Declining

BIRMINGHAM, ALA., Oct. 16.—Demand for pig iron in the Birmingham district has decreased to some extent and prices are lower. But little of the probable make of the fourth quarter remains to be disposed of and with the buying that will naturally come in in small bits, there will be no tonnage left over at the close of the year. Quotations of pig iron by those in the market range from $27.50 to $28 for No. 2 foundry, 1.75 to 2.25 per cent silicon. Car supply is still very bad here and iron movements show but little improvement over the past week. The consumption in the home territory continues active though cast iron pipe makers, high pressure pipe, announce their market is easing. The inquiries for 1923 pig iron are still numerous and intimate that foundries and other consumers are not well provided with iron and must add to stocks immediately on the turn of the new year. With but few exceptions, the inquiries are receiving little encouragement, interests here being unwilling to open books as yet for the next year's business. Surplus iron on yards is increasing. Production in this State is also increasing. The decrease in the demand has not interfered with the preparations being made for a still larger production, repairing of furnaces not being interrupted. No change in the plan to blow in three furnaces in November has been made and if the raw material and transportation facilities show the slightest improvement next month, there will be material increase in iron output. The poor transportation facilities were felt in the district hauling the past week, the steady moving of iron ore being disturbed for a few days. Bins at furnaces, however, carry from a week to 10 days' supply on hand and no interruption was noted in the pig iron make. The inquiries for pig iron for next year are coming in from every direction.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$27.50 to $28.00
Basic	27.50 to 28.00
Charcoal, warm blast	33.00 to 34.00

Cast-Iron Pipe.—While the lettings for cast iron high pressure pipe have practically become nil in the last few days, there is no slacking to any great extent in the manufacturing plant, as old orders are to be filled to considerable extent. The McWane Cast Iron Pipe Co., Birmingham, has taken an order from the city of Philadelphia for 60,000 ft. of 1¼ in. pre-calked joint cast iron pipe, to be used in a filtration plant now being constructed at Torresdale, Pa. The McWane company is building a new plant in Birmingham the first unit of which will be completed in March or April and will have a daily capacity of 8000 ft. of small sized pipe and give employment to about 150 men. The demand for the small sized cast iron pipe is very strong.

Steel Plants Busy.—All departments of the steel plants in this district are in operation, finishing mills in particular, wire and wire products, rails, sheets, bars, beams, producing steadily, in some instances overtime being gotten in. The transportation delays are also felt by this industry. Rail shipments for export are a little more active and one of the Chickasaw-built boats has docked to take on a cargo of products from this district, including rails, for Japan and China.

Old Material.—The scrap market shows no important change.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Coal and Coke.—Coal production is off again by reason of the short supply of railroad cars. The weekly output is below 340,000 tons. The coke demand has

taken on a new impetus and spot sales were recorded at $10 per ton for foundry coke. Delivery is a difficult matter with coke, too. Coke production will be increased when the car supply is better, the New Castle Coal & Coke Co. being prepared to resume operations at its beehive ovens just as soon as delivery can be guaranteed.

Philadelphia

Further Declines in Prices of Steel, Pig Iron, Scrap and Coke

PHILADELPHIA, Oct. 18.—The week has brought further declines in prices of plates, shapes and bars, pig iron, scrap and coke, notwithstanding the crucial situation in the Pittsburgh-Youngstown district, where the transportation tie-up is reported to have caused piling up a large tonnage of steel and consequent slowing down of production at some mills. The easier prices on steel are due largely to the action of Eastern mills, which in most instances did not load up their order books heavily at the low prices prevailing before the coal crisis, and which have now worked off a considerable portion of the premium business taken during that emergency. A buyer with a good specification to offer would now have no difficulty in buying plates, shapes and bars for fairly early delivery at 2c., Pittsburgh, and sales have been made within the past few days at this level.

Foundry iron is freely obtainable from Eastern furnaces at $31 for No. 2 plain and $32 for No. 2X, with a few sales having been made as low as $30, base, furnace. Foreign iron also is lower, and a grade practically equivalent to domestic No. 2X is obtainable at $30.75, Philadelphia dock, duty paid. In scrap there have been further declines within the past week.

Larger production has made bituminous coal much easier in price and supply, and this is reflected in lower coke price. Beehive furnace coke has been offered at $9, Connellsville, for standard grade and at $8 for medium sulphur grade. Foundry coke is available at about $1 a ton higher.

While the Pennsylvania Railroad has removed its embargo on west-bound shipments, the embargo on east-bound shipments remains in force, and the permit system is being employed. The lifting of the embargo on the Pennsylvania applies only to material originating on its own lines, which interferes particularly with the movement of scrap from New England points to the Pittsburgh district. The car service orders of the Interstate Commerce Commission further complicate the situation, and the steel trade is hoping that these will soon be suspended, in view of the fact that the soft coal crisis has passed.

Pig Iron.—Confusing elements enter into the present pig iron situation. Although there appears to be no surplus of domestic iron and production costs remain high, prices are slightly weaker. There is a demand for shipments on old orders, but very little inquiry for further requirements. Sellers have been predicting for two weeks a buying movement for November-December and first quarter of next year, which so far has failed to develop. A few sales of foundry iron have been made on the basis of $30 for No. 2 plain, but $31 for No. 2 plain and $32 for No. 2X are the prices which have prevailed on most of the orders booked within the past few days. Foreign foundry iron is offered at lower prices than were quoted a few weeks ago. A grade equivalent to domestic No. 2-X is available at $30, Philadelphia docks, to which is added the duty of 75c. a ton. Receipts of foreign iron at this port in the week ended Oct. 14 were 2214 tons from England, 1500 tons from Scotland, 50 tons from Sweden and 89 tons from Belgium. In the week ended Oct. 7 the receipts were 1975 tons from Belgium, 2000 tons from Scotland and 1000 tons from England. Basic iron is not in demand, but probably could be bought at $28 to $29, Eastern furnace. A sale of 2000 tons a week ago to a New England wire company was at $30, furnace. Gray forge has been offered by a central Pennsylvania furnace at $28, furnace, but a sale of 500 tons was entered by a local sales office a few days ago at $30, furnace. Domestic copper free low phosphorus is not available in the East, but foreign iron of the same grade is offered at $30, Philadelphia docks, duty paid. The outlook is for increased pig iron production in the East within the next month. The Alan Wood Iron & Steel Co. plans to put its No. 3 furnace, which has been out for repairs, in blast about Nov. 15. The Cambria works at Johnstown now has seven active furnaces and there are two operating at the Midvale plant of Coatesville. The long idleness of Virginia furnaces has been broken by the blowing in of the Max Meadows stack of the Virginia Iron, Coal & Coke Co. and the Pulaski Furnace Co. will blow its furnace in as soon as it can be got ready. The Goshen furnace will also probably go in blast shortly. The Virginia Public Service Commission has approved reductions in intrastate freight rates on ore and limestone of about 50 per cent and a tariff has been filed with the Interstate Commerce Commission, effective Nov. 3, reducing the freight rates on coke from the West Virginia fields to Virginia furnaces. The rate from West Virginia to the Roanoke and Clifton Forge group of furnaces on the Norfolk & Western and Chesapeake & Ohio railroads, which was $2.27 per ton, will become $1.70 and the rate to Rusens and Buena Vista, Va., will be reduced to $1.80. These reductions will effect a fairly substantial saving in production costs at Virginia furnaces. Virginia pipe companies have imported French iron at $23, c.i.f. Atlantic port, with a $2.50 freight rate to their plants, rather than pay the prices quoted by Virginia furnaces, which are $32 for No. 2 plain, and $33 for No. 2-X, f.o.b. furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$32.14 to $32.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	33.14 to 33.64
East. Pa. No. 1X	34.14 to 34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	29.50 to 29.75
Gray forge	31.00 to 32.00
Malleable	34.00 to 35.00
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00 to 38.00

Ore.—Receipts of Swedish iron ore last week at Philadelphia were 7881 tons. Three tons of manganese ore was received from Germany. In the week preceding 4000 tons of chrome ore from British South Africa was received here.

Coke.—The coke situation has eased perceptibly because of the larger soft coal production. Until to-day $10, Connellsville, was the lowest that had been quoted on furnace coke, but offers were received here of standard coke at $9, Connellsville, while a medium sulphur coke was offered at $8. Foundry coke is obtainable at $1 a ton higher.

Ferroalloys.—One American producer of ferromanganese has named $100, furnace. Importers of British ferromanganese still quote $67.50, Atlantic seaboard, duty to be added. There is very little demand, consumers having covered their needs for some time ahead before the new tariff became effective. Some ferromanganese brought in before the duty went on is being offered for resale at $100, which nets a profit of $32.50 a ton.

Semi-Finished Steel.—Open-hearth rerolling billets are to be had at $40, Pittsburgh, and forging billets at $45 to $47.50, Pittsburgh. Mills are turning down many inquiries for wire rods, which are firm at $45, Pittsburgh.

Plates.—A sudden weakness in plates has developed. Eastern mills are largely responsible for the lowering of quotations, as most of the Pittsburgh-Youngstown mills, excepting the Carnegie Steel Co., continue to quote 2.25c. The bottom of the plate market for some

weeks has been 2.10c., Pittsburgh, and this price has been made principally by one mill, but the working down of their order books has caused three or four other mills to quote 2c., Pittsburgh, on desirable business. At least that number of independent mills are said to have quoted 2c. on 900 tons of plates inquired for by the Philadelphia & Reading Railroad. The Chesapeake & Ohio placed about 2000 tons of car plates at 1.95c. or 2c., Pittsburgh, presumably with a Pittsburgh mill, while the Pennsylvania Railroad, which had inquired for 1000 tons for shipment this year and 5000 tons for first quarter, has covered on about half of this tonnage and is believed not to have paid above 2c., Pittsburgh. One Eastern mill adheres firmly to 2.25c., Pittsburgh, and some small orders were booked within the week at that price. We now quote the market at 2c. to 2.25c., Pittsburgh.

Structural Material.—In line with the weakness in plates, the price of structural steel is now 2c., Pittsburgh, on the bulk of desirable business, whereas 2.10c. had been paid in most instances up to a week or so ago. The market range is now 2c. to 2.10c., as some of the smaller and less desirable orders have not been taken below 2.10c. The latter price also applies where very prompt shipment is required, though most of the mills are now in better shape to make delivery promises. This excepts, of course, the mills in the Pittsburgh district, which are hampered by the car situation.

Bars.—While 2.25c., Pittsburgh, is still being paid in a few instances for bars, this is no longer representative of the market, the prices named by some mills for desirable specifications for early shipment being 2c. to 2.10c., Pittsburgh. The 2c. price is available on nearly all reinforcing bar business. Bar iron is weaker, but mills adhere to formal quotations of 2.15c., Pittsburgh. Buyers report being able to place orders below this figure. The demand for common iron is slow, but refined iron is fairly active. There is a good demand for staybolt and engine bolt iron.

Sheets.—Prices on sheets range from 2.60c. to 2.75c. on blue annealed 3.50c. to 3.75c. on black and 4.50c. to 4.75c. on galvanized, all base Pittsburgh. Most of the mills are pretty well sold up for the remainder of the year and it cannot be said that there is any real weakness in the market despite the spread in quotations.

Light Rails.—A local dealer has been offered German 12-lb. rails at $36 per gross ton, New York, or $39, San Francisco. Domestic mills quote 2c. to 2.25c., Pittsburgh, those making the higher price being able to make shipment from stock.

Wire Products.—The Cambria Steel Co. is practically out of the market on wire nails and plain wire and its price is 5c. per 100 lb. above those quoted by other mills. A shortage of labor at wire mills has caused a firm situation in wire products, and there is no pressure to sell.

Warehouse Business.—Local jobbers quote as follows on steel products for shipment from stock, local delivery:

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, 3/16-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—While some in the trade believe that the weakness in the scrap market noted last week has passed, this is not borne out by this week's price quotations, which in certain instances show still further reductions. The weakness in the market was caused largely by the congestion of finished steel at Pittsburgh and Youngstown mills, which forced curtailment of operations and a shutting off of scrap shipments. In addition the railroad embargoes have made it impossible to ship to some points, with the result that shipments were all routed to a few places. Such mills soon shut off shipments and a good deal of scrap was backed up in the East with few places to which it could be shipped. This caused a somewhat panicky feeling among dealers, who made offers of concessions. While heavy melting steel is not particularly weak, other grades have sagged. No. 1 railroad wrought has been sold at $22, a decline of $1; heavy breakable cast is also lower, and pipe is weak. Shafting is off $2 a ton. Steel axles have sold at $27.50, a decline since the last reported sale of $2.50 a ton. The Pennsylvania Railroad will now accept west bound shipments only and will accept only those which originate on its own lines. This shuts off considerable scrap which ordinarily moves from New England to the Pittsburgh district, and a good deal of this scrap is available for Eastern mills.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$18.00 to $18.50
Scrap rails	18.00 to 18.50
Steel rails for rolling	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	25.50 to 26.00
Cast iron car wheels	23.00 to 24.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	20.00 to 20.50
No. 1 forge fire	16.00 to 17.00
Bundled sheets (for steel works)	16.00 to 17.00
No. 1 busheling	15.50 to 16.00
Turnings (short shoveling grade for blast furnace use)	16.00 to 17.00
Mixed borings and turnings (for blast furnace use)	15.50 to 16.00
Machine shop turnings (for steel works use)	16.00 to 16.50
Machine-shop turnings (for rolling mill use)	16.00 to 17.00
Heavy axle turnings (or equivalent)	17.00 to 17.50
Cast borings (for steel works and rolling mills)	16.50 to 17.50
Cast borings (for chemical plants)	23.00 to 25.00
No. 1 cast	23.00 to 24.00
Heavy breakable cast (for steel plants)	20.00 to 21.00
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 16.50
Shafting	23.00 to 24.00
Steel axles	27.50 to 29.00

New Extras on Cotter Pins

The American Steel Co., Pittsburgh, has issued a new list of extras on cotter pins, effective Oct. 5. This list is premised on dropping the 90 per cent discount off the old list, also reducing on a few sizes but increasing on most sizes. The additions in fuel, labor and supplies are believed to warrant increased prices.

COMING MEETINGS

October

The National Association of Farm Equipment Manufacturers. Oct. 18 to 20, inclusive. Twenty-ninth annual convention, Congress Hotel, Chicago.

Society of Industrial Engineers. Oct. 18 to 20. McAlpin Hotel, New York. Business manager, George C. Dent, 327 South LaSalle Street, Chicago.

American Iron and Steel Institute. Oct. 27. General meeting, Commodore Hotel, New York. H. H. Cook, 40 Rector Street, New York, assistant secretary.

November

National Personnel Association. Nov. 8, 9 and 10. Annual convention, William Penn Hotel, Pittsburgh. W. J. Donald, 20 Vesey Street, New York, managing director.

National Founders' Association. Nov. 22 and 23. Fall meeting, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, secretary.

Dr. S. W. Stratton Elected President of Massachussetts Institute of Technology

Dr. Samuel Wesley Stratton, director of the Bureau of Standards of the Department of Commerce at Washington for the last 21 years and a noted physicist, was selected on Oct. 11 to be the next president of Massachusetts Institute of Technology. He will assume his new duties Jan. 1, next. Secretary Hoover has accepted his resignation from the bureau.

DR. S. W. STRATTON

Dr. Stratton was born in Litchfield, Ill., in 1861, and was graduated from the University of Illinois in 1884. For nine years he was professor of physics, mathematics and electrical engineering in the University of Chicago, after having spent seven years in a similar capacity in the University of Illinois. During the Spanish-American war he was commissioned lieutenant in the U. S. Navy. Yale, Cambridge and the University of Pittsburgh awarded him the degree of Doctor of Science. He is a member of the International Commission on Weights and Measures, American Institute of Electrical Engineers, American Society of Mechanical Engineers, American Physical Society, American Philosophical Society, American Association for the Advancement of Society and the National Academy of Sciences.

The resignation of Dr. Stratton will be felt by the steel industry. He contributed to its welfare not only as director of the bureau, but ofttimes through the channel of constructive technical papers presented before societies connected with the industry. On one such occasion he said: "If industrial problems are to be solved correctly, co-operation between such organizations as the American Iron and Steel Institute, the various steel companies and the Bureau of Standards is essential." And to this end two large laboratories erected during the war have been taken over by the bureau.

Dr. Stratton has repeatedly declined attractive offers from various industries. His retirement is attributed to the meager salary attached to his position. Mr. Hoover has endeavored to increase the pay of Government experts, in order to keep them in the Federal service, but Congress would not co-operate and as a consequence these experienced men are returning to industrial fields. In commenting on the retirement of Dr. Stratton, Secretary Hoover said: "The Massachusetts Institute of Technology, an educational institution, finds no difficulty in paying men of Dr. Stratton's caliber three times the salary the Government is able to pay them. Dr. Stratton has repeatedly refused large offers before, but the inability of the scientific men in the Government properly to support themselves and their families under the living conditions in Washington, and to make provision for old age makes it impossible for responsible department heads to secure such men for public service at Government salaries."

Thomas A. Edison has referred to Dr. Stratton as 100 per cent efficient. It is not known who will succeed him as director of the bureau.

Future Prices of Refractories Uncertain

PITTSBURGH, Oct. 16.—Conditions in the refractories market do not change much. While there are orders at present for all the fire clay and silica brick that can be shipped, this does not necessarily imply a big demand, since shipments still are more or less hampered by railroad transportation conditions. It is largely because of the railroad situation that the market is holding firm as to prices. Inability to ship fully means that manufacturers have to lay down the excess production and there is an additional item in the cost sheets through the retention of a full working organization on reduced plant operations. High costs naturally restrain price concessions, especially now with sufficient demand to take care of all the brick which can be shipped.

Nevertheless, there is a rather well-defined belief that present prices cannot hold. It is pointed out that with any betterment in the supply of cars and in the general performances of the railroads, consumers soon would have supplies sufficient to remove much of their present anxiety for shipments. It is also contended that the rise in fire clay and silica brick prices following the settlement of the coal strike did not merely recognize the increase in coal mining costs and the attendant adjustment in wages of brick plant labor, but also included the enhanced value of coal at the time. Coal prices since have come down appreciably from the levels prevailing in early September and another argument put forth in favor of lower prices is that independent steel companies, with but few exceptions, now are finding it rather difficult to sell at prices above those of the Steel Corporation. In other words, independent steel company prices are working lower. The general drift of iron and steel prices is down and this cannot fail to have a bearing on the prices that industry can or will pay for its raw materials.

On Pennsylvania silica brick, $45 per 1000, the general quotation, is not as low as sales are being made. Full application of the new duty to prices of magnesite and magnesite brick is not popular with consumers who feel the advance was too steep in view of the fact that as yet only duty free material is being marketed.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$39.00 to $42.00
Ohio	43.00 to 46.00	39.00 to 42.00
Kentucky	43.00 to 46.00	38.00 to 42.00
Illinois	43.00 to 45.00	40.00 to 42.00
Missouri	43.00 to 45.00	38.00 to 42.00
Ground fire clay, per net ton		7.50 to 8.50
Silica Brick:		
Pennsylvania		45.00
Chicago		53.00
Birmingham		48.00
Ground silica clay, per net ton		9.00 to 10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		75.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		43.50
Chrome Brick:		
Standard size, per net ton		50.00

To Resume Pittsburgh Basing Case

WASHINGTON, Oct. 17—The Federal Trade Commission will resume taking direct testimony in the Pittsburgh basing case in Washington, beginning Nov. 1, before Examiner J. W. Bennett. It is believed that this proceeding will continue one month. Present indications are that all of this testimony will be taken in Washington, though it might be decided to transfer the hearings to some other point. The names of witnesses and the character of the testimony have not been made known by the commission. After the closing of this testimony, the United States Steel Corporation will then present its testimony, and it is assumed that this will also take a protracted time and will be presented at various points of the country. After the closing of the Steel Corporation testimony, rebuttal evidence will be given by the commission preliminary to arguments, after which the case will be either dismissed or a cease and desist order issued. Should such an order be issued it is confidently believed the Steel Corporation would appeal the case to the courts and carry it through the Supreme Court of the United States if necessary.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.25c.

Structural Material

Beams, channels, etc.....2.00c. to 2.10c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c. to 2.15c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.25c.
Bands, base, per lb.....2.90c. to 3.25c.
Strips, base, per lb.....2.90c. to 3.25c.
Cotton ties, per bundle of 45 lb.....$1.13

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb..... 2.45
Annealed fence wire, base, per 100 lb..... 2.45
Galvanized wire, base, per 100 lb..... 2.95
Galvanized barbed, base, per 100 lb..... 3.35
Galvanized staples, base, per keg..... 3.35
Painted barbed wire, base, per 100 lb..... 3.00
Polished staples, base, per keg..... 3.00
Cement coated nails, base, per count keg..... 2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads .....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts .....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped..... 3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank..... 3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped..... 3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S.....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screw.....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.15
Large boiler rivets, base, per 100 lb..... 3.25
Small rivets .....65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb..... 3.50
Spikes, boat and barge, base, per 100 lb..... 3.50
Track bolts, base, per 100 lb..... 3.85 to 4.50
Tie plates, per 100 lb..... 2.35 to 2.50
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	51½	26	¼ to ⅜.....	+7	+33
¼ to ⅜.....	57	31½	½	26	8
½	62	48½	¾	32	17
¾	66	54½	1 to 1½.....	34	19
1 to 3.....	68	56½			

Lap Weld

2	61	49½	2	29	15
2½ to 6.....	65	53½	2½ to 6.....	32½	19
7 to 8.....	62	49½	7 to 12.....	30	17
9 to 12.....	61	48½			

Butt Weld extra strong, plain ends

⅛	47½	31	¼ to ⅜.....+15		+48
¼ to ⅜.....	53	36½	½	25	13
½	59	48½	¾	32	18
¾	64	53½	1 to 1½.....	34	20
1 to 1½.....	66	55½			
2 to 3.....	67	56½			

Lap Weld, extra strong, plain ends

2	59	48½	2	30	17
2½ to 4.....	63	52½	2½ to 4.....	33	21
4½ to 6.....	62	51½	4½ to 6.....	32	20
7 to 8.....	58	45½	7 to 8.....	25	13
9 to 12.....	52	39½	9 to 12.....	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel			*Charcoal Iron*	
1¾ in.	21½ to 23½		1½ in. .....+	7
2 to 2¼ in.....	36 to 38		1¾ to 1⅞ in.....	3
2½ to 3 in.....	47 to 49		2 to 2¼ in.....	13
3¼ to 13 in....	52 to 54		2½ to 3 in.....	18
			3¼ to 4½ in.....	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.....	40
1¼ and 1½ in.....	49	3 in.	44
1¾ in.	33	3¼ to 4 in.....	45
2 and 2¼ in.....	36	4¼ in. and 5 in.....	41

Hot Rolled

3 in.	46	3¼ to 4 in.....	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage.....	13	2¼-in. O.D. 10 gage....	17¾
2-in. O.D. 11 gage.....	14	3-in. O.D. 7 gage.....	33
2-in. O.D. 10 gage.....	15	1½-in. O.D. 9 gage.....	13
2¼-in. O.D. 12 gage....	15	5⅜-in. O.D. 9 gage.....	51
2¼-in. O.D. 11 gage....	16	5½-in. O.D. 9 gage.....	53

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C....$14.25	
8-lb. coating I. C....	9.60	30-lb. coating I. C....	15.25
15-lb. coating I. C....	11.80	35-lb. coating I. C....	16.25
20-lb. coating I. C....	13.00	40-lb. coating I. C....	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.85c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.80c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.85c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.75c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export...	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.315	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export.....	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic...	0.34	Detroit	0.295	Omaha	0.735
New York, export.....	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50		
Pac. Coast, ship plates	1.20		
Birmingham	0.69		
Memphis	0.385		
Jacksonville, all rail..	0.50		
Jacksonville, rail and water	0.415		
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Slight Decline in September—Bureau of Census Has Increased Capacity Figure

WASHINGTON, Oct. 17.—Sales of fabricated structural steel in September reflected a slight decline when compared with August, according to reports made to the Bureau of Census. Sales in September amounted to 61.9 per cent of shop capacity as against 64.9 per cent in August.

Reports received from 137 identical firms from April through September, with a shop capacity of 218,155 tons per month, show the following actual tonnages booked each month and the percentage of shop capacity represented by these bookings:

Month	Tonnage Booked	Per Cent of Capacity*
April	188,873	86.6
May	170,166	78.0
June	151,511	69.5
July	140,829	64.6
August	141,561	64.9
September	135,069	61.9

*The inclusion of additional firms this month has made slight revisions in the per cent of capacity reported previously.

Drop in Volume of Awards But Improvement in New Projects

Among the fabricated steel awards of the past week are the following:

Erecting shop of the American Locomotive Co., Schenectady, N. Y., 1000 tons, mentioned last week, will be fabricated and erected by the McClintic-Marshall Co.

Power plant for the West Penn Power Co., Springdale, Pa., 2500 tons, mentioned last week, was awarded to the McClintic-Marshall Co.

Two buildings for the Brooklyn Edison Co., Brooklyn, an employees' building and a switch house, totaling 3000 tons, to the McClintic-Marshall Co.

Fifteenth Regiment Armory, New York, 1700 tons, awarded some time ago to Post & McCord and then held up indefinitely, has been released and work will proceed at once.

Wrigley Building annex, Chicago, approximately 5000 tons, to American Bridge Co.

Mt. Vernon Car Mfg. Co., freight car repair shop, Mt. Vernon, Ill., 550 tons, to McClintic-Marshall Co.

Building for Childs Co., Chicago, 323 tons, to Holmes, Pyott & Co.

Prairie Oil & Gas Co., St. Louis, sixteen pipe line buildings, 708 tons, to Wisconsin Bridge & Iron Co.

Through truss and pony truss spans over Clearwater River, Spalding, Idaho, 266 tons, to Minneapolis Steel & Machinery Co.

Great Northern Railway, 250 pieces of steel plates for ore spouts, Allouez, Wis., 109 tons, to unidentified fabricator.

Gas holder for Conshohocken, Pa., 2500 tons, to Cruse-Kemper Co., Ambler, Pa.

Tileston & Hollingworth, Hyde Park, Boston, engine room addition, 100 tons, to the New England Structural Co.

Baseball cage, Andover, Mass., 125 tons, to the Boston Bridge Works, Inc.

Libby Owens Window Glass Co., Toledo, Ohio, 5500 tons, to the American Bridge Co.

Structural Projects Pending

Inquiries for structural steel works now being figured on include the following:

Equitable Building, Pennsylvania Station zone, New York, 10,000 tons; plans to be issued shortly for figures.

Baltimore & Ohio Railroad, bridges totaling 2500 tons; bids closed Oct. 18.

New York Central Railroad, rebuilding piers in North River, New York, 400 tons.

Car sheds for the Interborough Rapid Transit Co., New York, 148th Street, New York, 6000 tons; bids being received by the Transit Commission.

Chicago Mill & Lumber Co., Chicago, 400 tons.

Addition to Seneca Hotel, Rochester, N. Y., 500 tons, bids taken.

Chevrolet Motor Car Co., assembly plant at Buffalo, 200 tons.

Ford Motor Co., Detroit, assembly building and engineering laboratory, 4000 tons.

Fremont School, Cleveland, 200 tons.

Pattison Sargent Co., Cleveland, paint factory in Chicago, 230 tons.

State bridge in Leoni, Mich., 200 tons.

RAILROAD EQUIPMENT BUYING

Nearly 2500 Cars Ordered and New Locomotive Lettings and Inquiries

A steady run of car business continues but not in sufficient volume to lessen competition to any extent. The week's items include:

The Chicago, Rock Island & Pacific Railroad has ordered 10 mountain type and 30 Mikado type locomotives from the American Locomotive Co.

The Lehigh Valley Railroad has ordered 15 Mikado locomotives from the American Locomotive Co. in addition to 15 placed with the Baldwin Locomotive Works.

The Minarets & Western Railroad has ordered five Mikado locomotives and the Green Bay & Western Railroad has ordered 2 consolidation type locomotives from the American Locomotive Co.

The Pere Marquette Railroad is inquiring for 22 eight-wheel switching type locomotives.

The Southern Pacific, Texas Lines, is inquiring for nine Pacific type locomotives.

The Central Railroad of New Jersey is in the market for 5 to 10 Mikado type locomotives and expects to inquire for more later.

The Baltimore & Ohio Railroad has ordered 1000 hopper cars from the American Car & Foundry Co., a duplicate of an order recently placed.

The Fruit Growers Express has contracted for 1000 steel underframes with the American Car & Foundry Co.

The New York, Chicago & St. Louis has ordered 300 steel underframes from the Illinois Car Mfg. Co.

The Chicago, Rock Island & Pacific inquiry is for the following types of cars: Box cars, 500; coal cars, 500; automobile cars, 500; flat cars, 250; ballast cars, 250; refrigerator cars, 250; stock cars, 250.

The Ford Motor Co. has ordered 500 50-ton coal cars from the Cambria Steel Co. and an additional 500 has been ordered from another car company.

The Tennessee Coal, Iron & Railroad Co. has ordered from the Chickasaw Shipbuilding Co., also a subsidiary of the United States Steel Corporation, 195 cars of various types.

The Pere Marquette is inquiring for 1500 automobile and 500 hopper cars, or 2000 as mentioned last week.

The Chicago & Northwestern is inquiring for 36 coaches, 10 baggage, 2 buffet and 2 combination cafe and parlor cars.

The Fruit Growers Express has ordered 1000 steel underframes from the General American Car Co.

The Sinclair Refining Co. has placed 10 tank cars with the American Car & Foundry Co.

The Arms Yager Co. has ordered 14 horse cars from the Pullman Co.

The Texas Co. is inquiring for 75 single compartment 6000-gal. and 25 double compartment 6000-gal. tank cars.

The Virginian wants 1000 hopper cars.

The Central of New Jersey is in the market for repairs on 100 passenger cars in addition to its inquiry for 65 new passenger service cars.

The Elgin, Joliet & Eastern is inquiring for repairs on 500 freight cars.

Decrease in Blindness

A statement from the Eye Sight Conservation Council of America announces that in 1920 there were 52,617 blind persons in the United States as against 57,272 in 1910. This is a decrease of from 623 to 498 per million population. This showing, although attributed partly to the result of a change in the method of recording the blind, is taken to indicate beyond question a great improvement due to preventive measures of guarding against infection, and the education of industry as to the importance of eye care and the preventive methods against accidents. If the same ratio existed now that did in 1910, it is estimated that there would be over 13,000,000 people now having vision who would be blind.

That hazards to the eyes of industrial workers are very great and cause a heavy economic loss, and that steps should be taken by employers to save the eyes of the nation's millions of workers was pointed out by G. A. Henry, general director of the Council, in connection with the statement issued.

Industrial heating operations are to be discussed at a meeting of the American Society of Mechanical Engineers at Newark, N. J., by Joseph A. Doyle, W. S. Rockwell Co., New York.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
11	14.12½	13.75	33.75	6.62½	6.35	7.00	6.65
13	14.12½	13.75	34.12½	6.65	6.35	7.05	6.70
14	14.12½	13.75	....	6.65	6.35	7.10	6.75
16	14.12½	13.62½	34.50	6.65	6.35	7.15	6.80
17	14.12½	13.62½	34.50	6.65	6.35	7.20	6.85

*Refinery quotation.

New York

NEW YORK, Oct. 17.

The markets continue quiet and most of them are either firm or higher. No business was done on Thursday, Oct. 12, Columbus Day. The electrolytic copper market is the only one in which there has been any softening. Activity in tin has increased at advancing prices. There has been very little change in the strong position of the lead market, but there has been a marked recovery in zinc.

Copper.—The various rumors which have been current for the last few weeks regarding concessions in electrolytic copper have resulted in offerings by large and small dealers at 13.87½c., delivered, or 13.62½c., refinery, at which some business has been done and at which more metal is available. This is a concession of ⅛c. Large producers, however, continue to adhere to the 14c., delivered, price and the market is therefore quotable at 13.87½c. to 14c., delivered, or 13.62½c. to 13.75c., refinery. It is generally admitted that the amount available from dealers is not large, but nevertheless it is sufficient to be a factor in the market. There has been some let-up in foreign demand and also in domestic, due to the confused condition in transportation. Consumers, however, are using copper heavily and their return to the market is inevitable in the near future. Lake copper is practically unchanged at 14.12½c. to 14.25c., delivered.

Tin.—Sales of Straits tin have again been fairly heavy with the largest transactions reported on Wednesday, Oct. 11, totaling from 500 to 600 tons, mostly October delivery, with consumers and dealers the participants. One dealer is reported to have sold 250 tons of this. There were also fair sales of December shipment from the East during the latter part of the week at 33.87½c., and practically every day last week some business was done. The consuming demand referred to has been principally from alloy makers whose stocks are low. Tin plate producers are expected to be the best buyers later. The slow discharge of tin at docks and the difficulty in transporting it because of railroad conditions have been a factor in the market. Yesterday the market was very quiet but firm at 34.50c. for spot Straits tin, but a little easier for November arrivals at 34c. to 34.25c. To-day the market has been quiet with the quotation for spot Straits at 34.50c. New York. About 150 to 200 tons was sold largely on the New York Metal Exchange. This is the first time in many months that Straits tin has sold as high as these figures. The London market has also sharply advanced to £169 7s. 6d. for spot standard, £170 10s. for future standard and £170 7s. 6d. for spot Straits, all about £5 per ton over the prices a week ago. Arrivals thus far this month have been 3513 tons, with 8150 tons reported afloat.

Lead.—The market continues quiet but firm, with little change in prices. Consumption is heavy on contracts but there is no special demand and no great pressure to sell. The position of the market is as strong as ever and sellers for October and November are few. The leading interest continues to quote 6.30c., St. Louis, and 6.50c., New York, while quotations in the outside market are 6.35c., St. Louis, and 6.65c., New York.

Zinc.—The feature of interest has been the publication of statistics for September which showed a reduction in stocks for the month of 2823 tons. Although the September production of 33,134 tons was an increase of 1711 tons over August and also the largest for any month in two years, yet it was smaller than deliveries which were 35,957 tons. Previous to this the market has declined but, on the receipt of this news, it immediately started to advance until to-day it had practically recovered all the losses sustained on the re-action. Prime Western for delivery the rest of the year is quoted to-day at 6.85c., St. Louis, or 7.20c., New York. These quotations are practically the same as the high point in the recent advance late in September. Consuming demand is fairly good and the market has been active recently.

Antimony.—The market is quiet with wholesale lots of Chinese metal for early delivery quoted at 6.75c. to 7c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, made by foreign producers is obtainable from importers at 20c. to 21c. per lb., New York, duty paid, but the leading American producer continues its policy of declining to make public the prices at which it is selling its product.

Old Metals.—Business continues fair with a sluggish market. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.50
Lead, tea	4.00
Zinc	4.25

Chicago

OCT. 17.—Tin and spelter have advanced, while the other metals remain unchanged. The rise in tin was due to world market conditions, rather than to any particular activity to be noted in this territory. Spelter was active early last week, only to decline towards the end of the week and then to recover again. Buying of copper is rather liberal, but the possibilities of securing a concession under the market level appear brighter to-day than a week ago. Lead is quiet. Among the old metals, lead pipe, zinc and most grades of copper have advanced. We quote, in carload lots, lake copper, 14.50c.; tin, 35c. to 36c.; lead, 6.37½c.; spelter, 6.85c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 4.25c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

Oct. 17.—Lead for the week was steady and unchanged at 6.35c., carlots, while slab zinc was a little easier, 6.65c., against 6.75c. to 6.80c. last week. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c.; aluminum, 9c.

New Records in Cement Production

Portland cement produced in September, 11,424,000 bbl., while lower than the 11,664,000 bbl. in August and 11,557,000 bbl. in July, was greater than in any other month. The quarter's production, 34,645,000 bbl., was nearly 10 per cent above the highest previous quarter ever recorded. For the first nine months the output was 81,563,000 bbl., comparing with 72,307,000 bbl. in the first nine months of 1921. The year is almost certain to show the largest total ever achieved.

Final figures for production in 1921 are given by the Geological Survey at 98,842,049 bbl., and for 1920, the high record year to date, at 100,023,245 bbl. If 1922 shows the same ratio of gain over 1921 during the last three months as during the first nine months, the year's total will be about 111,000,000 bbl.

PERSONAL

William H. Oliver, manager of sales in Philadelphia since 1915 for the Republic Iron & Steel Co., Youngstown, Ohio, has been appointed manager of sales for this company in New York, effective Nov. 1, succeeding W. A. Phelan, who resigned several months ago to go into business for himself. Mr. Oliver's first connection with the steel business was with the Republic Iron & Steel Co. in New York, in February, 1900. He was sent to Philadelphia a year later and in January, 1915, became manager of sales of that office. Monday, Oct. 16, the pipe jobbers of Philadelphia gave a dinner in Mr. Oliver's honor and presented him a silver set. Mr. Oliver will be succeeded as manager of sales in Philadelphia by Charles S. McKinley, who about a year ago resigned as assistant general sales manager, Republic Iron & Steel Co., in Youngstown, Ohio, to go into the publishing business with his brother in Philadelphia. Mr. McKinley's first association with the company was as a salesman in the Philadelphia office. Later he was made Pittsburgh district sales manager, holding this position for about two years, being transferred to Youngstown Jan. 1, 1919, and made assistant general sales manager.

WILLIAM H. OLIVER

J. L. Mueller, formerly with the American Chain Co., York, Pa., has resigned to become vice-president and secretary in charge of production with the International Chain & Mfg. Co., that city.

W. K. Swigert, Indianapolis, has been appointed production manager of the Fox Motor Car Co., Philadelphia.

G. Morrison Gaither, Jr., who has been connected with the Winchester Repeating Arms Co., New Haven, Conn., for several years, was recently elected vice-president and general manager Baltimore Motor Service Corporation, Baltimore, Md.

W. F. Lusk has become secretary-treasurer and general engineer of the Hendry Machine & Engineering Co., Fort Myers, Fla.

George S. Westerfield has become manager of the southwestern district with the McIntosh & Seymour Corporation and is located in Houston, Tex.

J. M. Meany is now associated with the Lidgerwood Mfg. Co., Portland, Ore., as sales manager.

F. Scarf, managing director Bromford Iron Co., Ltd., West Bromwich, England, arrived in New York last week on the Berengaria. He will visit a number of hoop mills and cold rolled strip plants.

Lee Hillard, of the Chicago office, Bethlehem Steel Co., has been appointed structural sales agent at St. Louis for that company.

E. E. Hoffman, New York, has been appointed plant engineer at the works of the Hendee Mfg. Co., Springfield, Mass., in charge of the engineering division, with direct supervision of tools and tool design, product design, maintenance and inspection.

At a special meeting of the board of directors of the Grant-Lees Gear Co., Cleveland, Oct. 13, Henry A. Tremaine was elected director and president, succeeding as president Richard Ferguson, who was also general manager. Carl W. Blossom was elected a director. Mr. Blossom, who is president of the Automobile Screw Products Co., replaces F. E. Simmons on the board, Mr. Simmons having resigned as vice-president and as director. Mr. Tremaine is treasurer of the Standard Equipment Co. and a director of various companies in Cleveland, including the Peerless Truck & Motor Co. The company manufactures motor car and truck transmissions.

Albert Peter, for many years associated with the Chain Belt Co., Milwaukee, as a designing and production engineer, has resigned, effective Nov. 1, to become associated with the Milwaukee Air Power Pump Co. as chief engineer. The pump company has broken ground for a new works, 130 x 150 ft., on a new site.

R. N. Barnum, vice-president of the Mercer Motors Co., Trenton, N. J., has been elected president, succeeding George B. Smith, resigned. W. A. Smith, heretofore second vice-president, has been elected first vice-president to fill the place of Mr. Barnum. H. D. Fogg, assistant secretary and treasurer, has been advanced to secretary and treasurer.

T. W. Owen was elected permanent secretary of the American Gear Manufacturers' Association at its semi-annual meeting in Chicago last week. When the association recently decided to move its office from Philadelphia to Cleveland and that its growth and scope of activity necessitated a secretary who could devote his entire time to this work, Mr. Owen was chosen for this position and his election was formally approved at the Chicago meeting. He has been connected in a secretarial capacity with the Cleveland office of the Johns-Manville Co. for 10 years. The new offices of the association are at 2443 Prospect Avenue, Cleveland.

T. W. OWEN

F. C. Knight, for the past 10 years with the New England Coal & Coke Co., Boston, has associated himself with Alley & Page, Boston, pig iron, coke, etc.

David L. Eynon, president Pittsburgh Rolls Corporation, Pittsburgh, sailed on Oct. 10 for a two months' European tour during which he will visit the leading steel plants of England, France and Belgium.

N. T. Montague, Norton Co., Worcester, Mass., abrasives and grinding machinery, spoke on Factors Affecting Grinding Wheels Selection before the machine shop section, Providence Engineering Society, Providence, R. I., Tuesday evening, Oct. 10.

D. I. Miller, for several years manager of the Grand River, Ky., plant of J. B. Clow & Sons Co., has been appointed manager of that company's Coshocton, Ohio, plant. F. W. Schwab, who has been manager of both the Coshocton and Newcomerstown, Ohio, plants, will devote his entire time to the latter plant.

Walter S. McKee has resigned as vice-president and director American Manganese Steel Co., and will develop the business of the Inland Engineering Co., 28 East Jackson Boulevard, Chicago, of which he is president.

C. R. Dodge, recently western sales manager Lakewood Engineering Co., Cleveland, has been appointed sales manager of the Northwest Engineering Co., Green Bay, Wis., manufacturer of Northwest crawler cranes, draglines, shovels and similar equipment, with general sales offices at 28 East Jackson Boulevard, Chicago. Mr. Dodge was for several years in charge of the busi-

ness of the Milwaukee Concrete Mixer Co. in the East. Later he organized C. R. Dodge & Co., handling a general line of contractors' equipment, and then for several years was with the Lakewood Engineering Co. as manager of its Philadelphia office, later as field sales manager and finally as western sales manager. W. W. Mutter, vice-president Northwest Engineering Co., who had been in charge of the sales organization, will devote his time to production and special problems.

E. D. Jerome, formerly of the pig iron sales department of Bethlehem Steel Co.'s Boston office, has been appointed sales representative in New England by the Pulaski Iron Co., Real Estate Trust Building, Philadelphia, which will put its furnace in blast shortly, after two years' idleness. Mr. Jerome will have an office at 131 State Street, Boston.

President Julius Kahn of the Truscon Steel Co., Youngstown, Ohio, was the guest of honor at a "welcome-home" dinner given by associates on Oct. 14, following his three months' stay in Europe. Mr. Kahn took occasion to express his views on European conditions, voicing little hope for early revival of trade with continental countries, owing to their currency depreciation. He contends that cancellation of war debts would help in restoring such currencies to normal and thus stimulate trading.

Ray S. Dean has been appointed district manager Manning Maxwell & Moore, Inc., at Chicago. Mr. Dean was born at Sauk Center, Mich., Feb. 25, 1893, and attended the engineering school of the University of Minnesota, being a member of the class of 1906. In January, 1909, he entered the employ of Manning, Maxwell & Moore, and since then has remained with that company.

Jack E. Shibeler, for 10 years with the purchasing department of the Link Belt Co., Indianapolis, and later representing the LaSalle Steel Co. in the Indiana and Ohio territories, has been appointed as Indianapolis district manager of the Betz-Pierce Co., Cleveland, jobbers in iron and steel.

C. C. Upham, chairman of the board of directors of the Diebold Safe & Lock Co., Canton, Ohio, has been elected president of that company to fill the vacancy caused by the recent death of John C. Welty.

Henry L. Thompson, president Bostwick-Braun Co., Toledo, Ohio, and the William Bingham Co., Cleveland, wholesale hardware dealer and jobber in iron and steel, has been elected chairman of the board of directors and chairman of the executive committee of the Willys-Overland Co., Toledo, Ohio.

J. F. Geary, recently superintendent Niagara Radiator Co., North Tonawanda, N. Y., and previously in charge of various plants of the United States Radiator Corporation and the American Radiator Co., is now district manager in western New York, Ontario and northwestern Pennsylvania for the Business Training Corporation, New York, specialist in training courses in production methods for foremen and production executives.

During the first six months of 1922 the mining companies of Melilla, Morocco, exported over 100,000 tons of iron ore, of which a large portion went to Germany. The complete particulars are not yet available, but during the first five months only 17,000 tons were shipped to British ports and 52,430 tons to Rotterdam. In June and July only 8824 tons were shipped to Great Britain. It seems clear, says the London *Iron and Coal Trades Review*, that these exports have considerably affected the sales of iron ore at Bilbao and Santander.

In the Mahoning and Shenango Valleys jobs are more plentiful than men to fill them, say employment managers. Many plants are seeking workers. For common labor from 40 to 55c. per hr. is being paid. The demand for common labor exceeds that for skilled workmen. Shortage of sheet mill workers is being experienced to some extent, and schedules announced by makers at the beginning of a week are seldom maintained throughout the period.

OBITUARY

Frederick E. Anthony

FREDERICK E. ANTHONY, who for many years was in charge of the automatic screw machine tool designing of the Brown & Sharpe Mfg. Co., died on Oct. 8, his 58th birthday, leaving a widow and one son, Clyde. Mr. Anthony was born in East Providence, and at the age of 17 entered Brown & Sharpe's employ as an apprentice. He remained with the company until January, 1890, after which he worked with the Eastman Kodak Co., and with Bugbee & Niles, North Attleboro. In October, 1898, he returned to the employ of the Brown & Sharpe Co., where he remained until the time of his death. A friend of long standing pays him this tribute:

"Mr. Anthony represented the type of trained mechanic which has made so much for the progress of mechanical lines in this country. He was fertile in devising ways and means of doing work, and his sound mechanical judgment and training kept him from various pitfalls that are so apt to embarrass a mechanical genius. Through his advice and experience, many of the details of the automatic screw machines were brought out, and there is hardly a large manufacturing plant in the country making use of this type of machine that is not using some of the plans that Mr. Anthony had worked out. His loyalty to the company was such as showed itself in continually seeking to advance the solution of problems of customers with whom he came in contact. As a companion and shopmate, his untiring courtesy and cheerfulness made him a man who was able to impress himself upon all who came in contact with him as a companion to be cultivated from a sense of pure friendship."

HARRY JACOB FRANK, SR., president of the Frank Foundries Corporation, Davenport, Iowa, died on Oct. 4, following an illness of six months. He was 71 years of age, having been born at Akron, Ohio, on Dec. 28, 1850. Mr. Frank came to Davenport in 1888 and for 10 years was superintendent of the Davenport Machine & Foundry Co. In 1898 he started in business for himself and established the Frank Foundries on West Second Street and Wilkes Avenue. In 1915 a branch foundry was established in Moline under the same firm name.

JOHN B. FOOTE, president and treasurer Foote Bros. Gear & Machine Co., Chicago, died suddenly in that city on Oct. 12. Just two days before Mr. Foote had served as toastmaster at a banquet of the American Gear Manufacturers Association in that city. Mr. Foote was prominent in the activities of that society and was a member of the Executive Committee and chairman of the Industrial Relations Committee. The deceased was born in Chicago in 1865.

GEORGE KOOP, president Columbia Architectural Iron Works, Chicago, died in that city on Oct. 8. Mr. Koop was born in Germany in 1860, coming to America 17 years later. In 1888 he founded the company of which he was president at the time of his death.

SPENCER F. MOORE, chief engineer Collins Co., Collinsville, Conn., died on Oct. 11, in his 36th year. Mr. Moore was born in Schenectady, N. Y., and was graduated from Sheffield Scientific School, Yale University. Later he was associated with the Westinghouse Electric & Machine Co. and the Terry Steam Turbine Co., Hartford, as a mechanical engineer. During the war he was a senior lieutenant and was stationed at the Naval School, Hoboken, N. J.

CHARLES S. GINGRICH, head of the sales department of the Cincinnati Milling Machine Co., Cincinnati, died in that city, Oct. 10, from a complication of diseases, at the age of 48. He had been with the company for about 22 years and was well known throughout the machine tool trade.

EMIL A. FOHT, chief engineer, Miller Saw Trimmer Co., Pittsburgh, died at his home in Sewickley, Pa., after a brief illness of pneumonia. He was born in Erie, Pa., 41 years ago.

British Iron and Steel Market

America Still Buying British Pig Iron — Steel Prices Generally Lower—September Exports, 279,169 Tons

(*By Cable*)

LONDON ENGLAND, Oct. 17.

America is inquiring for pig iron and sales are being made covering December and January shipment. The market is firm, with continued scarcity of better grades of Cleveland material.

Hematite is firmer on sustained demand for home and export. Sales have been made to America, but generally these have been of special analysis iron. Bilbao Rubio is nominally 23s. to 23½s. ($5.10 to $5.21) ex-ship Tees.

There is improved demand for finished iron and steel. China and Japan are inquiring for bridge building material and the Indian Government is making substantial purchases of railroad equipment. Prices are firm.

India, China and Japan are buying Continental steel in small lots. Czecho-Slovakian merchant bars are being sold at £9 (1.78c. per lb.) c. i. f. Japan. Belgian merchant bars have been sold at £7 17½s. (1.56c. per lb.) cost and freight to India. Continental pig iron is quiet.

Tin plate is firmer, with more export buying, including substantial quantities for Germany. Welsh tin plate makers have agreed to a minimum selling price of 19¼s. ($4.27) basis, f.o.b. The Welsh association has reduced tin plate bars to £7 ($31.08) delivered.

Galvanized sheets are steady, with moderately small demand. Japan is inquiring for black sheets and some sales have been made. Small sales have been made also to the Continent and India.

Total British exports of iron and steel in September were 279,169 tons. [This compares with 281,954 tons in August and 251,743 tons in July.]

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.44 per £1, as follows:

Durham coke, delivered	£1	10½s.	to £1	11s.	$6.77	to	$6.88
Cleveland No. 1 foundry	4	17½			21.64		
Cleveland No. 3 foundry	4	12½	to 4	15	20.53	to	21.09
Cleveland No. 4 foundry	4	10			19.98		
Cleveland No. 4 forge	4	5			18.87		
Cleveland basic	4	0			17.76		
East Coast mixed	4	12	to 4	12½	20.42	to	20.53
Ferromanganese	15	0			66.60		
Ferromanganese*	14	10	to 14	15	64.38	to	65.49
Rails, 60 lb. and up	7	5	to 8	0	32.19	to	35.52
Billets	7	2½	to 8	0	31.63	to	35.52
Sheet and tin plate bars, Welsh	7	0			31.08		
Tin plates, base box	0	19	to 0	19¼	4.22	to	4.27
					C. per Lb.		
Ship plates	8	10	to 9	0	1.68	to	1.78
Boiler plates	11	10	to 12	0	2.28	to	2.38
Tees	9	0	to 9	10	1.78	to	1.88
Channels	8	5	to 8	15	1.63	to	1.73
Beams	8	5	to 8	15	1.63	to	1.73
Round bars, ¾ to 3 in.	9	0	to 9	10	1.78	to	1.88
Galvanized sheets, 24 g.	16	2½	upward		3.19		
Black sheets	12	0			2.38		
Steel hoops	11	0	& 11	10*	2.18	&	2.28*
Cold rolled steel strip, 20 g.	23	2½			4.58		
Cotton ties, Indian specifications	15	0			2.97		

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:							
Belgium, Dec.	£4	5s.	to £4	7½s.	$18.87	to	$19.42
Luxemburg, Dec.	4	5	to 4	7½	18.87	to	19.42
France, Dec.	4	5	to 4	7½	18.87	to	19.42
Billets:							
France, Dec.	5	12½	to 5	14½	24.97	to	25.41
Luxemburg, Dec.	5	12½	to 5	14½	24.97	to	25.41
Lorraine, Dec.	5	12½	to 5	14½	24.97	to	25.41
Wire nails (keg basis):							
Germany	0	14½			3.22		
Belgium	0	20½			4.55		
Wire rods, 5 mm. (0.2 in.):							
Belgium	7	5	to 10	7½	32.19	to	46.06
Angles:					C. per Lb.		
Belgium, Sept.	7	7½			1.46		
Tees:							
Belgium	£8	5s.			$1.63		
Merchant bars:							
Belgium, Jan., Feb.	7	0	to £7	5s.	1.39	to	$1.44
Luxemburg, Jan.	7	2½			1.41		
France, Jan.	7	5	to 7	7½	1.44	to	1.46
Germany, Jan., Feb., Mar.	7	0	upward		1.39		
Joists (beams):							
France, Dec.	6	10	to 6	15	1.29	to	1.34
Belgium, Nov., Dec.	6	12½	to 7	0	1.31	to	1.39
Luxemburg, Dec.	6	10	to 6	15	1.29	to	1.34
Channels:							
Belgium	7	10	to 7	12½	1.49	to	1.51
⅜-in. plates:							
Germany, Dec., Jan.	7	5	to 7	7½	1.44	to	1.46
Belgium, Dec.	7	7½	to 7	10	1.46	to	1.49
Luxemburg, Dec.	7	5			1.44		
France, not offered.							
⅛-in. plates:							
Germany	9	0			1.78		
No. 8 gage wire:							
Belgium	14	10⅝			2.88		

Price of Fuel Increasing—Two Substantial Contracts Involving Steel—Export Demand Fair

LONDON, ENGLAND, Oct. 5.—There is no doubt that conditions in the iron and steel trade are beginning to improve and, as will be seen further down, one or two substantial steel contracts have been placed here. The demand for pig iron from your side has caused a temporary shortage of the better grades of foundry material, so that prices are firmer and though the volume of new business coming from America is now beginning to diminish, considerable quantities have yet to be shipped, probably occupying makers for the rest of the year. On the other hand, fuel prices have been stiffening rapidly, and as pig iron producers feel that already they are paying too high a price for fuel, there is talk of the value of pig iron being shortly advanced by about 5s. per ton. Output remains pretty well as it has been for the last few weeks; another furnace was started on the North East coast this week, but makers are not keen on making any general increase in production while fuel prices maintain their upward tendency. No. 3 G. M. B. is quoted at 95s. for prompt shipment when available, and at 92s. 6d. for shipments November-December. Export buying of hematite has shown considerable improvement, Italy and Belgium being the main consumers to exhibit interest. Moreover, consumers in the home trade are also more inclined to buy hematite, seeing that it is cheaper than foundry and makers have therefore been enabled to considerably reduce their stocks. The present price of East Coast mixed numbers is about 90s. to 91s. for home and export.

During the past fortnight some substantial contracts, which will involve steel works, have been placed here. Messrs. Pearson & Sons have secured a contract running into £3,000,000 for irrigation work in the Sudan, while the Foundation Co. has been awarded a contract involving about £250,000 for further extensions in the London tube railroad. It is reported that British shipyards will shortly be awarded contracts for eight steamers for a Western Australia concern, which will involve a cost of about £2,000,000. The Fairfield Shipbuilding & Engineering Co. has received orders from the Union Steamship Co. of New Zealand for a passenger liner of displacement of about 22,000 tons b.hp. It is stated that this will be the fastest and largest motor ship afloat. As will be seen by these various contracts, there is a marked improvement in steel business. Prices are low and while not many works are willing to accept them, those who have done so are now in possession of quite a fair quantity of orders, and are stiffening their values.

General export buying has been offering from the Far East, the first to make its appearance for some few months past, and it is hoped that buyers and sellers will be able to negotiate orders. Canada is also reported to be buying plates here. Of our export markets Australia is still the best buyer, India not showing a great deal of interest. Home trade buying as a general rule is confined to parcels for immediate requirements, but now that the tendency is for raw materials to advance, and consequently for steel prices to stiffen, it is anticipated that purchasers will come in to cover themselves more freely.

To Hold Power Exposition in New York

The National Exposition of Power and Mechanical Engineering to be held at the Grand Central Palace in New York from Thursday, Dec. 7 to Dec. 13, closing, however, on the intervening Sunday, is being planned in co-operation with the national societies interested in the economy of fuel and in the production and use of power generated therefrom. The opening of the exposition in the Grand Central Palace will take place on the closing day of the annual meeting of the American Society of Mechanical Engineers, and time has been set aside in the A. S. M. E. program so that members desiring may attend the opening exercises.

The American Society of Refrigerating Engineers is to hold its meeting at the Hotel Astor for three days commencing Dec. 5, and its members, as well as the members of the A. S. M. E., will be admitted to the exposition upon the presentation of their membership cards.

On the advisory committee of the exposition are Irving E. Moultrop, Edison Electric Illuminating Co. of Boston, chairman; Dexter S. Kimball of Cornell University, president American Society of Mechanical Engineers; Alexander G. Christie, chairman power division A. S. M. E.; Fred Felderman, president National Association of Stationary Engineers; Milan R. Bump, president National Electric Light Association; N. A. Carle, vice-president Public Service Production Co. of New Jersey; E. B. Katte, chief engineer electric traction New York Central Railroad; Fred R. Low, editor *Power;* David Moffat Myers, consulting engineer, New York; Calvin W. Rice, secretary American Society of Mechanical Engineers; and the managers, Charles F. Roth and Fred W. Payne, with offices in Grand Central Palace.

To Hold Electric Switch Exhibit at Philadelphia

A congress and exhibit has been planned by the Philadelphia section of the Association of Iron and Steel Electrical Engineers to be held at the Hotel Majestic, Philadelphia, Saturday, Nov. 4. About twenty-five manufacturers of safety switches for 600-volt services and below, including motor starting switches of the across-the-line type only and limit switches for cranes, will exhibit their products at that time. The exhibit will open at 1 p. m. and at 6.30 p. m. a dinner will be served. Following the dinner P. T. Vanderwaart, electrical engineer of the New Jersey Zinc Co., Palmerton, Pa., will deliver a paper on the subject followed by a general discussion.

Fact-Finding Commission Beginning Its Labor

WASHINGTON, Oct. 17.—The fact-finding coal commission recently appointed by President Harding will hold its first meeting at 11 o'clock to-morrow in the office of George Otis Smith, director of the Geological Survey. It is the expectation of the commission to first study Government reports on coal production, costs, etc., which probably will require one month, before beginning a thoroughgoing survey throughout the mining districts of the country. It is believed that John Hays Hammond will be named chairman of the commission. The seven members of the commission are representative of the public, none of them being associated with the coal industry. It will study the industry from production to consumption in more exhaustive detail, it is stated, than has been attempted previously. The results of the investigation are expected to be made the basis for legislation intended to remedy permanently conditions in the industry that have led to frequent strikes, and shortage and high prices of fuel. President Harding and his advisors are said to be convinced that the "fundamental illness" of the coal industry is that it has failed to modernize and this phase of the question is to be given particularly careful study by the commission with a view to placing coal mining on an efficient basis.

It has been stated that neither the commission nor the Government will attempt arbitrarily to prevent strikes but rather an effort will be made to eliminate causes of strikes. Besides Mr. Hammond other members of the commission are: former Vice-president Thomas R. Marshall; Clark Howell, editor Atlanta *Constitution;* George Otis Smith; Dr. Edward T. Devine, Iowa, and Charles P. Neil and Judge Samuel Alschuler, of Illinois.

Brier Hill Steel Co. Plans

Engineers of the Brier Hill Steel Co., Youngstown, are continuing their study of the company's expansion program, and directors have not yet approved any program. In addition to adding lap weld tube mills, the company is likewise considering the construction of butt weld units. The lap weld mills planned will roll pipe from 2 to 12-in. in diameter, though the company has considered units capable of rolling 16-in. pipe. Skelp for these mills will be furnished from the 132-in. plate mill, for the larger sizes, and from a new strip mill, which is to be added, for the smaller sizes.

According to plans now in process, butt weld units may be added to produce wrought iron pipe, absorbing part of the output of the Youngstown Steel Co. at Warren. Interests of the Brier Hill company control the Youngstown Steel Co.

Porter-Cable Machine Co. Buys Another Company

The Porter-Cable Machine Co., Syracuse, N. Y., manufacturer of lathes, has purchased the plant and business of the Syracuse Sander Mfg. Co., Syracuse, and will manufacture the products of the latter company in its own plant, these including disk sanders, oscillating spindle sanders, belt sanders, band saws and wood lathes, all motor driven and designed especially for pattern shops. The building and machinery of the Syracuse Sander Mfg. Co. will be offered for sale.

British Pig Iron and Steel Output for September

LONDON, ENGLAND, Oct. 16 (*By Cable*).—The production of pig iron in Great Britain in September was 430,300 gross tons and that of steel ingots and castings 555,900 tons. These compare with 411,700 tons of pig iron and 520,800 tons of steel ingots and castings in August.

The pig iron and steel output for Great Britain by months so far this year has been as follows in gross tons:

1922	Pig Iron	Steel Ingots and Castings
January	288,000	327,500
February	300,100	418,800
March	389,800	549,400
April	394,300	404,200
May	407,900	462,300
June	369,200	400,200
July	399,100	473,100
August	411,700	520,800
September	430,300	555,900

The September output of pig iron and steel is the largest month of the year. The 1921 pig iron production averaged 217,600 tons per month and the steel output 302,100 tons per month. In 1913 the two figures were 855,000 tons and 639,000 tons per month respectively.

Pulverized coal is to be used in the stoker fired boiler plant at Roanoke of the Norfolk & Western Railroad. The plant comprises six 200 hp. Babcock & Wilcox boilers, each to have one vertical coal burner and five 400-hp. boilers, each to have three vertical pulverized coal burners. Various grades of coal from the Pocahontas field are to be used, especially bone and refuse coal, varying in ash content from 20 to 38 per cent with a calorific value of 10,000 to 11,000 B.t.u. per pound. The equipment will be installed by the Fuller Engineering Co., Allentown, Pa., and will include a Fuller-Lehigh rotary dryer, Fuller-Lehigh pulverizers, and the distribution of the powdered fuel will be by means of the Fuller-Kinyon conveying system over a distance of 250 ft. in 4-in. pipe lines.

PENNSYLVANIA TOOL INQUIRY

Road Asks for Prices on 80 Machines—Buys $225,000 Worth of Cranes

PHILADELPHIA, Oct. 18.—The Pennsylvania Railroad has issued an inquiry calling for prices on about 80 machine tools, aggregating about $300,000 in value, for its new shops at Altoona, Pa., and has placed an order for 16 cranes for the same shops with the Niles-Bement-Pond Co. The crane order, the largest of its kind placed in the East in years, totals upwards of $225,000 and includes two of 250 tons capacity; two 60-ton, two 50-ton, 10 15-ton.

The tool inquiry covers the following machines and it is expected in the local machine-tool trade that purchases will be made within the next few weeks:

One axle lathe.
One journal turning lathe.
Two 30-in. engine lathes.
Four 24-in. engine lathes.
Nine 16-in. engine lathes.
One 36-in. engine lathe.
One 48-in. engine lathe.
Three No. 5 knee-type milling machines.
One 42-in. coach wheel lathe.
Six 36-in. vertical turret lathes.
Three 42-in. vertical turret lathes.
One 90-in. tire mill.
Two 90-in. driving wheel lathes.
Ten 36 in. x 4 in. wet emery grinders.
Two 36-in. planers.
Two 48-in. planers.
Three Warner & Swasey No. A turret lathes.
Three 5-ft. radial drills.
One 6-ft. radial drill.
Two 3¼ in. x 40 in. horizontal turret lathes.
Five 24-in. shapers.
Two 2¼ in. x 26 in. horizontal turret lathes.
One 2-in. pipe machine.
Two 15-in. slotters.
Three 18-in. slotters.
Four 5-in. portable cylinder boring bars.
One crown and staybolt threading and reducing machine, six spindles.
One bolt turning machine, four spindles.
One bolt pointing machine.
One 1½-in. bolt heading machine.

The Pennsylvania Railroad has just placed orders for one 90-in. Sellers driving wheel lathe, one Betts journal turning lathe, one Niles quartering machine, and one 1½-in. semi-automatic bolt threading machine and one 1½-in. roll threading machine, the latter two machines being purchased from Manning, Maxwell & Moore, Inc.

Progress Report on Rock Drill Steel Breakage

WASHINGTON, Oct. 17.—The report relating to the existing status of the practice of heat treatment of drill steels and the extent to which breakage occurs has been completed by engineers serving the Bureau of Mines and the Bureau of Standards. The report will be considered by the executive committee of the advisory board appointed by the American Institute of Mining and Metallurgical Engineers to co-operate with the two bureaus after which it will be made public. Being of a preliminary character the report is to be followed by work for another year on the subject, when special attention will be devoted to the study of breakage in oil well drills.

Request has been made by Benjamin F. Tillson, chairman of the executive committee, for members of the committee to meet on Nov. 17 for discussion of the report just completed and to recommend any changes that may be considered necessary before presentation of the report to the institute on Feb. 20.

It is indicated through field work on the problem, done largely by Francis B. Foley and Charles Y. Clayton, metallurgists with the Bureau of Mines, and by Henry S. Burnholz, a Bureau of Standards metallurgist, that greatly increased efficiency in mining operations may be obtained by distributing more precise knowledge regarding the breakage of drill steel and its heat treatment.

Drill steel handling at 60 mines west of the Mississippi River was studied during April, May and June by the three metallurgists and results of all the work done are summarized in the report to be considered on Nov. 17 by the executive committee. This committee is composed of the following: B. F. Tillson, New Jersey Zinc Co., chairman; W. H. Leonard, Denver Rock Drill Mfg. Co.; Dr. J. A. Mathews, Crucible Steel Co. of America; Van H. Manning, American Petroleum Institute; D. A. Lyon, Bureau of Mines; G. K. Burgess, Bureau of Standards.

American Steel Shipments to South Africa

Total imports into the Union of South Africa, from the United States, amounted in 1913 to $17,851,000, in 1920 to $82,946,000, and in 1921 to $38,931,000. As these figures are respectively 9½, 18 and 16 per cent of the total imports of that country, the American share has been almost doubled in percentage since before the war. Iron and steel and other metal imports and manufactures of metal are covered in an appended table, which has been taken from a report of the United States vice consul at Cape Town. In showing the amounts which the United States and Great Britain, respectively, furnished in 1921 in a large number of mechanical items, and the percentage which the United States figure bore to the whole, the table indicates in some measure the lines along which special efforts to increase sales might bear fruit.

Imports into South Africa of Metal Manufactures
(Expressed in Thousands)

Articles	Total	Great Britain	United States	Per Cent	Others
Agricultural machinery	$6,706	$2,639	$2,584	38	$890§
Aluminum ware	229	90	8	3½	108*
Brass and manufactures	365	304	10	3	16†
Clocks and watches	525	69	169	32	234‡
Copper and manufactures	162	122	33	20	...
Electrical machin'y, etc.	9,131	5,664	2,935	31	...
Enameled ware	724	349	47	6½	206*
Hardware and cutlery	10,484	7,210	1,605	15	650*
Iron and steel:					
Bars, bolts, rods	2,172	1,609	54	2½	167‖
Chains	205	139	42	20½	...
Beams	581	421	65	11	50¶
Hoops	106	48	26	25	...
Pipes and fittings	1,403	1,076	140	10	151*
Wrought iron and steel	1,756	1,191	174	10	301*
Lead and manufactures	108	56	41	39	...
Machinery and parts:					
Air compressors	243	126	95	39½	...
Bands and belting	921	461	430	46½	...
Battery cloth	184	162	18	10	...
Boilers	900	848	40	4½	...
Cranes	438	266	74	17	97§
Elevators	322	300	21	6½	...
Engines	1,148	1,031	104	9	...
Machine tools	7,376	5,434	1,365	19	241*
Mining	6,425	3,478	1,697	26½	141*
Printing	807	388	398	49	...
Pumps	731	425	184	25	105‡
Windmills	572	98	468	82	...
Rails and railroad material	1,096	563	361	33	...
Telegraph and telephone material	290	185	61	21	...
Tin and tinware	435	390	14	3	...
Tramway material	629	341	286	45	...
Vehicles and parts:					
Bicycles	454	391	40	9	...
Carriages	188	...	62	33	76§
Motorcycles	829	328	481	58	...
Motor trucks and cars	4,829	1,113	2,295	58	1,159§
Total of above	$63,474	$37,315	$16,427	26	...

*Germany; †Japan; ‡Switzerland; §Canada; ¶Belgium; ‖Canada, with Belgium sending $112(000) also.

Samuel D. Sleeth, general superintendent foundries, Westinghouse Air Brake Co., Wilmerding, Pa., was the speaker at the regular monthly meeting of the Pittsburg Foundrymen's Association, General Forbes Hotel, Oct. 16. His subject was "Cupola Practice," and he traced in interesting fashion many of his experiences covering a period of more than 50 years, touching on fluxes, mixes, iron and refractories.

An address on machine shop practice will be given by A. L. DeLeeuw, consulting engineer, New York, at the Hotel Winton, Cleveland, on the evening of Oct. 24 before the Cleveland section of the American Society of Mechanical Engineers.

Machinery Markets and News of the Works

MORE RAILROAD INQUIRY

Pennsylvania and Burlington Roads Issue Large Lists of Tools

Railroads, Steel Companies, Automobile and Electrical Machinery Manufacturers Buying

The Pennsylvania Railroad has issued a large list of tools at Philadelphia, calling for bids on shop equipment that will aggregate in value several hundred thousand dollars, and the Chicago, Burlington & Quincy has issued a new list of about 30 items at Chicago covering machines required for its Eola scrap reclamation yard.

Railroad buying promises to increase. The Chicago, Burlington & Quincy has been in the market for some time for a list of tools in addition to the one issued last week, and will probably make large purchases within a few days. The Chicago & Northwestern is expected to issue a list at Chicago shortly.

Steel companies are buying more equipment, cranes in particular. The National Tube Co. has received prices on 14 heavy tools and 41 cranes for its new plant at Gary, Ind.

In the automobile field, the Ford and Dodge companies are the principal buyers. The Ford Motor Co. has closed for seven Bullard Mult-au-matics and the Dodge Motor Co. has bought 10 engine lathes, 12 to 18 in., and two turret lathes from Cleveland. The Nash Motors Co. has bought 11 cylindrical grinding machines for its Milwaukee plant. Detroit automobile manufacturers have bought sparingly of new equipment considering the extent to which they have increased output, but the larger production has been achieved largely by better methods. It is estimated that some companies have increased output about 25 per cent with only a 5 per cent increase in tools.

The General Electric Co., which has been buying for some weeks, has placed additional orders within the past week, its purchases being for Schenectady and Bridgeport plants.

The Hoover Suction Sweeper Co., North Canton, Ohio, has issued an inquiry for about a dozen machines.

New York

NEW YORK, Oct. 17.

A NUMBER of machine-tool manufacturers have put higher prices in effect within the past week, the advances averaging about 10 per cent. This may be the explanation for a slump in buying last week, which dealers and factory representatives believe to be only temporary, as the general trend of trade seems to be toward continued improvement. The General Electric Co., as reported last week, is in the market for additional equipment for its Schenectady works and also has inquiries out for tools for its Bridgeport plant. The Baldwin Locomotive Works has about completed purchases for its plant in Philadelphia. The Pennsylvania Railroad is expected to come into the market shortly for considerable equipment for additions to its shops at Altoona.

Although there is considerable activity in crane sales in other districts, the New York territory continues quiet with a number of satisfactory orders pending. It is expected that the orders for the two 150-ton overhead traveling cranes for the Brooklyn Edison Co., Brooklyn, N. Y., will be placed the latter part of this week. Inquiry for locomotive cranes is active and dealers in used locomotive cranes report fewer available. A noticeable number of orders are appearing for small capacity chain blocks and hoists from dealers, evidently to fill in stock. Hand power crane inquiry is quiet.

Among recent sales are:

The Pennsylvania Railroad, Eastern Region, Philadelphia, has placed an order for 17 electric traveling cranes valued at about $225,000 with the Niles-Bement-Pond Co. They include two 250-ton, two 60-ton, two 25-ton and ten 15-ton electric cranes for the Juniata shops.

Central Railroad of New Jersey, a 150-ton wrecking crane from the Industrial Works.

Union Contracting Co., Falls Creek, Pa., two used 30-ton, 50-ft. boom Ohio locomotive cranes and one 25-ton, 60-ft. boom used Industrial locomotive crane from Philip T. King, 30 Church Street, New York.

American Car & Foundry Co., 165 Broadway, New York, a 15-ton locomotive crane from the Orton & Steinbrenner Co.

Mukden Electric Light Works, Mukden, Shengking, Manchuria, a 30-ton, 39-ft. span overhead traveling crane from the Whiting Foundry Equipment Co., through an exporter.

Consolidated Machine Tool Corporation, 17 East Forty-second Street, New York, has purchased cranes for its Hilles & Jones plant, Wilmington, Del., from an unnamed builder.

Matachewan Power Co., Elk Lake, Ont., a 15-ton electric traveling crane from the Northern Engineering Works.

Vulcan Iron Works, Winnipeg, Canada, a 5-ton, 2-motor crane trolley from the Northern Engineering Works.

Ford, Bacon & Davis, 65 Broadway, New York, who were recently in the market for two 10-ton overhead traveling cranes, have purchased used equipment from Government sources.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 24 for 12,300 lb. of brass tubing for voice transmission, schedule 219; and until Oct. 31 for 305 mechanical thermometers, schedule 222, for the Brooklyn Navy Yard.

The Rubel Coal & Ice Corporation, Glenmore Avenue, Ozone Park, Brooklyn, is arranging a list of machinery for its ice-manufacturing plant on Atlantic Avenue, estimated to cost $500,000.

Charles L. Cadle, Superintendent of Public Works, Capitol Building, Albany, N. Y., will receive bids until Nov. 1 for a power plant at Vischer Ferry on the State Barge Canal. Plans and specifications are at the office of the State Engineer, Telephone Building, Albany.

The American Brake Shoe & Foundry Co., 30 Church Street, New York, is reported to have acquired property at Houston, Tex., for a new plant estimated to cost $400,000, including equipment.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until Nov. 15 for mechanical equipment for the power house to be built in connection with the veterans' hospital, Tupper Lake, N. Y., including side-feed mechanical stokers, feed-water heater, pumping machinery and incinerator plant (boilers will be furnished by the Government), all as set forth in specification 4719. Also at the same time for refrigerating and ice-manufacturing machinery, including compressors, condensors, filters, etc., with can hoist and automatic can dump, specification 4720; and for a 200,000-gal. steel tank and tower, specification 4724.

The United Plumbers' Supply Co., 181 East 108th Street, New York, manufacturer of pipe, plumbing equipment, etc., has filed plans for a two-story factory, 80 x 170 ft., on Exterior Street to cost $75,000.

The Utility Can Co., Long Island City, has leased space in the new building on Van Alst Avenue, near the Queensboro Bridge Plaza, for a manufacturing and distributing plant.

Fire, Oct. 2, destroyed a portion of the plant of the Merchants' Refrigerating Co., Tenth Avenue and Seventeenth Street, New York, with loss estimated at $200,000, including equipment. It will be rebuilt.

Grover A. Whalen, Commissioner of Plant and Structures, New York, is perfecting plans for a trackless trolley system on Staten Island, estimated to cost $4,235,000. Of this amount, $1,235,000 will be used for an electric generating plant, for which a site has been selected. The electrical and mechanical equipment for the cars will cost in excess of $800,000.

In connection with the construction of a railroad from Cochabama to Santa Cruz, Bolivia, for which the Bolivian Government is now calling for tenders, complete repair shops will be built at a number of points along the line, which will be 388 miles, with a 37-mile branch road. The project is estimated to cost in excess of $40,000,000. Information can be had at the office of the Bolivian Exhibit and Information Bureau, 233 Broadway, New York.

Officials of the Radio Corporation of America, Woolworth Building, New York, and the Federal Telegraph Co. of California, San Francisco, have organized the Federal Telegraph Co. of Delaware, capitalized at $9,500,000. The new company will conduct initial operations in China, where a contract has been secured from the Chinese Government for the construction of four high-power wireless plants to cost about $13,000,000, including electric power stations, steel towers, radio apparatus, etc. R. P. Scheerin, president of the Federal company of California, will occupy a similar position with the new organization. The Radio Corporation has purchased the White Oil Building, 64-68 Broad Street, New York, for about $1,000,000, and will establish a central broadcasting and receiving plant at this point.

The Ingersoll-Rand Co., 11 Broadway, New York, manufacturer of mining machinery, etc., has called a special meeting of stockholders on Nov. 1 to vote an increase in the common stock from $15,000,000 to $30,000,000, a portion of the proceeds to be used for expansion.

The Baltic Ice Co., Inc., 87-93 Columbia Street, Brooklyn, has filed plans for extensions and improvements in its two-story ice-manufacturing and refrigerating plant to cost $50,000.

A three-story automobile machine and service works, 75 x 100 ft., to cost $80,000, will be erected at 531-35 West Thirty-sixth Street, New York, by Alfred Revere and Morris Goldenblum, care of Henry J. Nurick, 44 Court Street, Brooklyn, architect.

The Mammoth Oil Co., an interest of the Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, has disposed of a stock issue of $10,000,000, a portion of the proceeds to be used for the construction of pipe lines, pumping plants, power houses and other structures in the Teapot Dome field, Wyoming, recently leased from the Government under a joint production plan.

The American Smelting & Refining Co., 120 Broadway, New York, has arranged a fund of about $10,000,000 for extensions and improvements in its plants and properties in Colorado, including the installation of new machinery.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 24 for one precision bench lathe and attachments, for the naval aircraft station, Lakehurst, N. J.

The Lehigh Valley Railroad Co., Jersey City, N. J., will commence the erection of a new one-story locomotive repair shop at the foot of Chapel Avenue, to cost $25,000.

The Franklin Contracting Co., 20 Washington Place, Newark, has acquired about 37 acres at Edgar, near Perth Amboy, N. J., for a new plant to manufacture road materials.

The Newark Umbrella Frame Co., 359 Ogden Street, Newark, plans the installation of new automatic machine equipment.

The City Commission, Newark, plans the installation of equipment at the power house and refrigerating plant at the new city market, now in course of erection, as follows: Generators and engines, $48,000; boilers and steam piping, $40,000; elevator equipment, $40,000; refrigerating plant, $100,000; equipment for driven wells, $10,000; vacuum ash conveyors, $15,000; incinerators, $10,000; general market equipment, $350,000, and ventilating apparatus, $5,000.

Chicago

CHICAGO, Oct. 16.

PROSPECTIVE railroad business is still the feature of the machine tool market. The Chicago, Burlington & Quincy, which has been at the point of buying against its lists for several weeks, is expected to finally close for this equipment within a few days. The Chicago & Northwestern will probably issue an extensive inquiry in the near future and the Chicago, Rock Island & Pacific, which recently purchased considerable equipment, has issued an inquiry for a carwheel boring machine. The Burlington has issued a new list consisting largely of special machines for its Eola scrap reclamation yard near Aurora, Ill. Sales of local machine tool houses have fallen off since the first of the month, and it is apparent that the general users, outside of the railroads, are taking less interest in the market. Among the few outstanding orders placed recently is a purchase of 11 cylindrical grinding machines for cam and crankshaft work by the Nash Motors Co. for its Milwaukee plant. Additional business is pending for that plant.

The Eola list of the Burlington is as follows:

One 500-lb. upright helve hammer for 4 to 5-in. bar iron.
One vertical power press with capacity of 100 tons.
One combination punch and shear, 36-in. jaw, capacity 1½-in. hole in 1-in. steel plate, to shear plates ⅞-in. thick.
One double head bolt threader, to thread bolts ½ to 1¼ in. in diameter.
One triple head bolt threader, two heads to cut ½ to 1¼ in. in diameter and other head to cut 1⅜ to 2 in.
One bolt shear, capacity ½ to 2 in.
One rapid bolt straightening machine for straightening old bolts ½ to 2 in. in diameter.
One high-speed six-spindle automatic nut tapping machine, capacity ½ to 1⅝ in.
One machine for backing off nuts from old bolts, capacity ½ to 2 in.
One automatic sorting machine for sorting nuts and washers.
Two self-dumping rattlers, 24 x 36 in.
Two double spindle bench dry grinding machines to carry 10 x 1¼-in. wheel.
One automatic rail spike straightener.
One automatic pipe nipple machine.
One dismantling and assembling machine for air, signal and steam hose.
One single head pipe threading machine, from 1 to 1½ in., to rethread air and steam hose nipples.
One automatic angle cock valve grinding machine for grinding angle cocks and cutting out cock valves.
One portabble electric welding outfit.
One portable electric rivet heater, for rivets ⅜ to ¾-in.
One double-door furnace, 12 x 12 x 36 in.
One pneumatic straightening and flanging clamp, capacity to take 120 in. between housings, with vertical adjustment for upper clamping beam of 15 in.
One portable machine for cutting pipe and flues, capacity ½ to 2-in. pipe.
One automatic sheet iron baler.
One automatic washer punch, capacity ½ to 2½ in.
One automatic round bar iron straightening machine with feeding device, capacity ½ to 2-in. round iron.
One coupler stripping machine for removing yokes from couplers.
One sheet straightening roll for straightening sheet iron and steel, 5 ft. between housings, capacity up to 2-in. steel.
One bender for corrugated bars, capacity ⅝ to 1½-in. square bars.
One power baler for baling waste paper, burlap, rope, etc., into 250-lb. bales.
Practically all of the machines are to be motor driven.

The Arnold Co., Chicago, has purchased a locomotive jack from the Whiting Corporation for the Richmond, Fredericksburg & Potomac Railroad. The latter company also has orders for two tumbling barrels for a Chicago plant of the International Harvester Co. and for a 10-ton hand power crane for the Calumet sewage treatment plant of the Kensington sanitary district.

The Chicago Mill & Lumber Co., 111 West Washington Street, is taking bids through Francisco & Jacobus, 29 South LaSalle Street, on a two-story factory, 300 x 400 ft., at North Sangamon and Cornell Streets.

H. P. Hansen of the engineering staff of the Viking Pump Co., Cedar Falls, Iowa, will be the head of the new company which will build a foundry in that city.

The plant of the Illinois Foundry & Machine Co., Belleville, Ill., was recently damaged through the explosion of a cupola.

The American Parts Corporation, manufacturer of automobile radiators and radio specialties, Toluca, Ill., will re-

move its plant to Rochelle. The former Whitcomb factory on the south side of Rochelle is being remodeled.

A two-story building is being erected for the B. F. Downing Chevrolet sales agency at Dixon, Ill. The upper floor will be occupied by a machine and repair shop.

John Stoneberg, formerly superintendent the boiler repair shop of the Chicago, Milwaukee & Gary Railroad at Rockford, Ill., has leased the building and will conduct a private boiler repair shop.

The Andrews Wire & Iron Works, 1802 Preston Street, Rockford, Ill., has preliminary plans for a one-story addition to cost $40,000. Peterson & Johnson, 406 S. A. Bank Building, are architects.

The Stoll Mfg. Co., Denver, Col., has plans under way for rebuilding its main plant unit, recently destroyed by fire. New equipment will be installed for the manufacture of automobile bodies and accessories.

The United States Reclamation Service, Denver, will receive bids until Dec. 6 for two direct pumping units for the Black Canyon pumping plant, Boise, Idaho, project.

The Air Sales Reduction Co., 342 Madison Avenue, New York, manufacturer of welding equipment, etc., is taking bids for its one-story addition, 50 x 100 ft., at 327 Twenty-fifth Avenue, S.E., Minneapolis, Minn., estimated to cost $35,000.

An ice manufacturing and cold storage plant will be installed in the five-story meat packing plant, 200 x 400 ft., to be constructed by the Mountain States Packing Co., Denver, Col., estimated to cost $2,000,000 with machinery. Charles F. Kamrath is president.

The American Radiator Co., 816-20 South Michigan Avenue, Chicago, will take bids early in November for its one and two-story plant on Minnehaha Street, St. Paul, Minn., for the manufacture of boilers, heaters, etc. It will cover an area 195 x 1000 ft., and is estimated to cost $1,200,000, including machinery. A. R. Stem, St. Paul, is architect.

The Hanford Produce Co., Sioux City, Iowa, has completed plans for a new ice manufacturing and refrigerating plant, 100 x 150 ft., to cost about $100,000 including machinery. A. S. Hanford, Jr., is head.

The Nebraska Gas & Electric Co., Omaha, Neb., will install additional power equipment at its plant at York to double, approximately, the present capacity.

The Producers' & Refiners' Corporation, California Building, Denver, is considering plans for a new oil refinery at Fort Steele, Wyo., estimated to cost $250,000. A simliar refinery is also planned in the vicinity of Omaha.

The Art Lamp Mfg. Co., 6 North Franklin Street, Chicago, manufacturer of electric lamps, etc., is taking bids for a two-story plant at Michigan Avenue and Thirteenth Street, estimated to cost close to $50,000.

New England

BOSTON, Oct. 16.

FEWER machine tools were sold in this section the past week than in the previous week. A fair business was done, however, in moderate priced single new machines and in used equipment. Most of the dealers attribute the slowing up to the holiday, the recent price advances having stimulated rather than stinted buying interest. Industry in New England is increasingly busy, yet extensions and new plants are limited, while new corporations in a large majority of cases have no bearing on metal working machinery. Inquiries for new equipment therefore are confined largely to more or less special production tools. The aggregate number of these under full and semi-negotiation is quite large. Sentiment, generally, is that October will be the best month experienced by many dealers this year, notwithstanding the lack of large lists of tools.

The demand for small tools and machine parts, which fell off last month, shows improvement. With the exception of drills and reamers, prices for small tools and for many materials tend upward. In connection with the better demand for fine tools, the L. S. Starrett Co., Athol, Mass., heretofore on a three day a week schedule, this week went on four days, having materially reduced its accumulation of made up stock. The hack saw department has been on full time and will continue so.

The Ball & Roller Bearing Co., Maple Avenue and Crosby Street, Danbury, Conn., has begun work on a two-story, 50 x 114 ft. addition for the manufacture of grinding machinery. J. Henry Roth is general manager and treasurer.

The New York, New Haven & Hartford Railroad has reopened a portion of its shops at New Haven, Conn., closed since July 1. Work to be done will supplement the work of engine terminals and freight car repairs pending the completion of added facilities at its Cedar Hill yards.

The Boott Mills, Armory Street, Lowell, Mass., has awarded contract for a hydroelectric power plant. It will be one-story, of brick and concrete, and cost about $40,000.

The Blakeslee Forging Co., Plantsville, Conn., drop forging, plans the erection of a two-story, 40x42-ft. foundry addition.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Oct. 24 for four motors, controllers and spare parts for the Portsmouth, N. H., Navy Yard.

The Brass City Tool Works, 29 Pearl Street, Waterbury, Conn., is taking bids for a two-story and basement addition to cost $45,000. L. S. Kipp, 121 Charles Street, is architect.

The Lake Sunapee Power Co., Rutland, Vt., will soon take bids for a new hydroelectric generating plant to cost about $300,000, including machinery. I. M. Frost is president.

The Merrimac Clay Products Co., 185 Devonshire Street, Boston, will soon commence the erection of a one and two-story-plant, 200 x 600 ft., at Plaistow, N. H., to cost about $225,000 with machinery. Morse & Chase, 25 Washington Square, Haverhill, Mass., are architects.

A three-story automobile service and machine works, 80 x 120 ft., to cost $100,000, will be erected on Harrison Avenue, Springfield, Mass., by G. H. Chaplin, 374 Main Street.

Landers, Frary & Clark, New Britain, Conn., manufacturers of cutlery, etc., will commence the erection of a new six-story addition, to cost approximately $75,000.

The Home Accessories Corporation, Gardner and Tainter Streets, Worcester, Mass., manufacturer of metal bathroom fixtures, etc., has plans for a new two-story factory, 45 x 110 ft., estimated to cost $40,000, on a site lately acquired.

The Auto Truck & Wagon Co., 141 First Street, Cambridge, Mass., is taking bids for a one-story addition, 83 x 100 ft.

Philadelphia

PHILADELPHIA, Oct. 16.

THE Electric Storage Battery Co., Nineteenth and Allegheny Streets, Philadelphia, has purchased about two acres at Belmont Boulevard and Anderson Street, Kansas City, Mo., for the erection of branch works. Plans are being prepared for the first unit, one-story and basement, 160 x 220 ft., and estimated to cost $120,000. A main feature of production will be battery assembling. An electric plant will be installed for factory service, comprising a 50-kw. motor-generator set, with auxiliary machinery. Hans Von Unwerth, Finance Building, Kansas City, is engineer. The company has also awarded contract to Peter Hauck, Cox Building, Rochester, N. Y., for a new branch plant at this point, one-story, 134 x 135 ft.

The Precision Grinding Wheel Co., Inc., Torresdale Avenue, Philadelphia, has filed plans for a one-story addition.

The Philadelphia-Nash Motor Co., 901 North Broad Street, Philadelphia, has leased a five-story building, to be erected at Broad and Thompson Streets, for the establishment of new works, including service and repair departments. Contract for erection was awarded recently to the Turner Concrete Constuction Co., 1713 Sansom Street.

The Reliable Auto Parts Co., 1417 Fairmont Avenue, Philadelphia, has leased property at 1405-7 Race Street, for new works.

The J. Biehl Wagon & Auto Works, 31 South Fifth Street, Reading, Pa., has plans under way for a new two-story plant at West Reading, 85 x 200 ft., for the manufacture of automobile parts, equipment, etc.

The Bradford County Oil & Coal Co., Towanda, Pa., recently organized, is planning for the installation of oil-well pumping machinery, drilling equipment, etc., on local property. Louis A. Poillet and John Conklin head the company.

The Penn Central Light & Power Co., Altoona, Pa., has arranged for a bond issue of $80,000, the proceeds to be used for work in connection with a new power plant at Saxton, Pa.

The Lehigh Coal & Navigation Co., Lansford, Pa., is planning for the construction of a new mechanical coal washery in the vicinity of Tamaqua, Pa., to cost about $50,000.

The Cumberland Valley Light & Power Co., Dillsburg, Pa., has acquired the Dillsburg Light, Heat & Power Co., the Reading Township Power Co., and a number of other public utility companies operating in this section. The properties will be merged and a number of extensions and improvements made. The consolidated company is capitalized at $175,000. Farley Gannett is president.

The Scranton Wire Works, 723 West Lackawanna Avenue, Scranton, Pa., has arranged for the establishment of a new department to manufacture metal grille work and similar specialties. The regular line of wire goods will be continued.

The Metropolitan Edison Co., Reading, Pa., has arranged for a preferred stock issue of $828,750 a portion of the proceeds to be used for extensions and improvements. E. L. West is president.

The Coopersburg Improvement Co., Coopersburg, Pa., is concluding negotiations for a new granite polishing and finishing plant.

The Elk Run Window Glass Co., Punxsutawney, Pa., is planning to rebuild its tool house and engine department recently destroyed by fire.

The Fleck-Marshall Co., Lancaster, Pa., manufacturer of pipe, plumbing equipment, etc., has acquired the plant of the Rothfuss-Howard Iron Works, East Third Street, Williamsport, Pa., heretofore devoted to the manufacture of machinery and parts. It will be remodeled and occupied by the new owner.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has awarded contract to the McClintic-Marshall Co., Oliver Building, Pittsburgh, for a new locomotive machine and erecting shop at Juniata, Pa., 340 x 685 ft. Two crane runways, 720 ft. long, will be built, one with a span of 104 ft. and the other 90 ft. In the locomotive erecting bays two 250-ton electric traveling cranes will be installed, while the machine bays will be equipped with two 25-ton traveling cranes, and a number of jib cranes, up to 8-tons capacity. Six 15-ton cranes will also be placed in the locomotive department. The plant will have a capacity of 100 locomotives per month, new and old. A. C. Shand is chief engineer.

The Hillside Coal & Iron Co., Pittston, Pa., is planning for the installation of new machinery at its colliery.

The New York Central & Hudson River Railroad Co., New York, is reported to be planning for additions to its locomotive and boiler shops at Lock Haven, Pa., estimated to cost $250,000, including machinery.

Pittsburgh

PITTSBURGH, Oct. 16.

BUSINESS in machine tools the past week with regard to sales has been dull. Inquiry is good, but when it comes to closing, the disposition of buyers is to be positive that every source of supply has been sounded as to prices. The market in this district is created to a very large degree by the iron, steel and metal-working industries and while these lines of activity are busy now, there has lately crept into the situation some hesitancy and uncertainty. A large volume of machine tool and equipment business is hanging over the market.

The largest prospective order before the trade is that for the new works of the National Tube Co., Gary, Ind. There are 14 heavy tools in the inquiry and 41 cranes. It is reported that the crane bids have been compiled and sent to New York for approval, following which the papers will be returned to Pittsburgh and orders distributed. Tool awards are not looked for until the cranes have been placed. The Pittsburgh Valve Foundry & Construction Co., Pittsburgh, recently closed for a 5-ton Champion crane. The Pittsburgh & Lake Erie Railroad, C. M. Yohe, purchasing agent, has inquired for a 90-in. wheel lathe. The Pennsylvania Railroad has put out a list of 10 tools, on which bids will close Oct. 19, for its Conway shops at Freedom, Pa.

Hubbard & Co., Granite Building, Pittsburgh, manufacturers of shovels, etc., with factory at 6301 Butler Street, have plans for a one-story addition.

The Pittsburgh Meter Co., East Pittsburgh, has purchased about 120,000 sq. ft. in the vicinity of its plant, for $125,000. The site will be used for the erection of a new plant estimated to cost $115,000.

The Argo Lite Appliance Co., 649 Smithfield Street, Pittsburgh, manufacturer of electric lighting equipment, has acquired property at Seventh and Smithfield Streets and will use the buildings for extensions.

The Kinzua Light & Power Co., Kinzua, Pa., is planning the construction of a new power plant. A list of equipment will be prepared.

The Vulcan Refining Co., Coraopolis, Pa., will build a new one-story power house, 56 x 60 ft. E. C. Dilworth, 302 Walsh Building, is consulting engineer.

Ovens, power equipment, conveyors and other equipment will be installed in the new three-story plant to be erected on Forbes Street, Pittsburgh, by the Dusenberry Baking Co., 2138 Tustin Street. Plans are being drawn.

The Equitable Gas Co., 435 Sixth Avenue, Pittsburgh, will build a new one-story machine and repair shop, 50 x 165 ft., with extension 15 x 20 ft.

The Provant Coal Co., Uniontown, Pa., contemplates rebuilding the tipple at its Provant mine destroyed by fire Oct. 7. The fan house and mechanical draft equipment were also destroyed.

The Open-Hearth Fire Brick Co., 1407 Keenan Building, Pittsburgh, is planning for the installation of new machinery at its Freeport plant. H. O. Williams is in charge of purchases.

The Monongahela Power & Railway Co., Fairmont, W. Va., is arranging an appropriation of about $1,000,000 for extensions and improvements in its plants and system.

The Maidsville Coal & Coke Co., Morgantown, W. Va., will build a new tipple at Maidsville. The company was organized recently and is headed by Wilson C. and Guy L. Jamison, both of Morgantown.

The Armstrong Mfg. Co., Huntington, W. Va., manufacturer of hardware and electrical products, will commence the immediate erection of an addition to double the present capacity. The company has recently increased its capital from $300,000 to $500,000.

The Consolidation Coal Co., Watson Building, Fairmont, W. Va., will build a new one-story power house at Coalwood, W. Va., to cost about $90,000.

Baltimore

BALTIMORE, Oct. 16.

PLANS by the Hatfield Resilient Wheel Co., 431 Munsey Building, Baltimore, are nearing completion for a new one-story factory, 50 x 100 ft., at Wells Street and the Baltimore & Ohio Railroad, to cost close to $30,000. S. C. Hatfield is president.

The Bartlett-Hayward Co., Scott and McHenry Streets, Baltimore, manufacturer of gas plant equipment, etc., is considering the erection of a one-story addition, 200 x 262 ft.

The United States Engineer Office, Wilmington, Del., will take bids until Oct. 20 for four electric generator sets, steam-driven, 3½, 5, 7½ and 10-kw. capacity, respectively; also for two 2½-kw. generator sets.

The Construction Quartermaster, United States Army, Norfolk, Va., plans the erection of two new power houses at Fort Storey.

R. E. Campbell, 1000 Taylor Street, Columbia, S. C., is planning the erection of new works to manufacture stoves, heaters and similar products. A company will be organized to operate the plant.

The Southern Power Co., Charlotte, N. C., has plans for a new steam-operated electric power house at Mountain Island, N. C., with initial capacity of 40,000-hp., to be used for emergency service, supplementing its new hydroelectric generating plant in this locality.

The Southern Machinery Co., Quitman, Ga., will build an addition to its foundry and machine shops to double the present capacity. F. C. Underwood is president and general manager.

The American Oil Co., American Building, Baltimore, has acquired a portion of the Smith Shipyard property, Curtis Bay, and has tentative plans for a new oil storage and distributing plant estimated to cost $500,000, including machinery.

The Board of District Commissioners, room 427, District Building, Washington, will receive bids until Oct. 24, Oct. 30 and Nov. 13 for equipment in the new Eastern high school, including motor-generator set, pressure and vacuum pumps, and auxiliary equipment; wood-working shop and art metal department equipment, metal lockers, and print shop equipment. Cuno H. Rudolph, James F. Oyster and Charles Keller are commissioners.

L. F. Hobbs, 113 East Twelfth Street, Norfolk, Va., machinery dealer, is in the market for a locomotive crane, 35 ft. boom, to handle a ¾-yd. capacity bucket.

The du Pont Motors, Inc., Wilmington, Del., manufacturer of high-speed automobiles, is concluding negotiations for property on Vandever Avenue, for local works. The structure will be improved and the plant at Moore, Pa., removed to this location. E. Paul du Pont is head.

The South Carolina Gas & Electric Co., Spartanburg, S. C., recently reorganized, has acquired the plants and property of the South Carolina Light, Power & Railways Co. A fund of $300,000 is being arranged for extensions and improvements.

to include an addition to the hydroelectric generating plant at Gaston Shoals on the Broad River, enlargements in the steam-operated power plant at Spartanburg, and new power houses. Transmission line extensions will also be made. George B. Tripp is president, and Paul W. Fisher, secretary and treasurer.

W. W. Taylor & Sons, Big Stone Gap, Va., are planning to establish works for the manufacture of brick and tile. Inquiries are being made for machinery.

The Richmond, Fredericksburg & Potomac Railroad, Richmond, Va., is arranging a list of equipment for installation at a new water cooling plant, including tanks, pumps, compressors and auxiliary equipment; also for a new forge and blacksmith shop, with power house. Bids will be called in about 30 days.

The Common Council, Robbinsville, N. C., plans the erection of a municipal hydroelectric power plant on Wiggins Creek, estimated to cost $100,000.

The Better Brick Co., Cumberland, Md., recently organized, has acquired property at Allegheny Grove, and has plans in progress for a new works to manufacture special brick, roofing tile, and concrete products. Theodore Smith is general manager.

The General Purchasing Officer, Panama Canal, Washington, will take bids until Nov. 2 for equipment for canal zone service, including copper tubing, boiler tubes, bolts, rivets, nails, section cars, storage batteries, valves, tiller rope, galvanized buckets, etc., as set forth in circular 1499.

The Potomac Public Service Co., Hagerstown, Md., is perfecting plans for a new steam-operated electric power plant at Williamsport, Md., estimated to cost $1,500,000.

The American Septic Tank Co., Charlotte, N. C., has plans under way for new works at Spencer, N. C. J. B. Davis is general manager.

The Standard Electric Machinery Co., East Hill Street, Baltimore, machinery dealer, is inquiring for two 3 to 5-kw. engine-generator sets, to operate at 80-lb. steam pressure.

J. Max Chambers, High Point, N. C., is perfecting plans for the establishment of a factory to manufacture automobile equipment and accessories. The Chamber of Commerce is interested in the project.

F. M. Young, Fairfax, S. C., is planning to rebuild his power house, recently damaged by fire with a loss of $25,000. Additional equipment will be installed.

The Winchester Lumber Co., Winchester, Va., will soon commence the erection of a new mill at Gore, Va., estimated to cost $35,000 including equipment. W. B. Cornwell is president.

Power Plant Activity

The Fama Co., Paris, France, will build the automatic stokers which will go under six boilers of the central power station of Paris, each of which will develop approximately 2400 hp. with a grate area of 645 sq. ft., giving them what is held to be the largest grate and combustion chamber ever before attempted. The stokers will be of the Riley type, and will be built under license from the Sanford Riley Stoker Co., Worcester, Mass., the Fama people holding the rights to this stoker for France. The underfeed type is held to be well adapted for the use of the low grade French coal.

The Riley company reports much better prospects in the power plant field. The larger public utilities are now able to borrow money at reasonable rates, and a great deal of work is being laid out for execution in the immediate future. Much work which had been held up for a long time is now being released. The Public Service Electric Co., Burlington, N. J., is proceeding toward the construction of its new station, which had been held up for two years. The installation will contain the largest Riley stoker that has been built in this country.

In the industrial field there are many boiler room extensions, about to be undertaken, among them the Viscose Co., Lewiston, Pa., manufacturer of artificial silks, Stephen Sanford & Sons, Inc., Amsterdam, N. Y., carpet manufacturer, Dodge Brothers, Detroit, and Bird & Sons, Inc., Phillipsdale, R. I., manufacturer of special paper products.

The railroads have not come into the market much for power plant equipment, but some of them are now planning for electrification, according to the Riley company. Two have already announced that their policy is to purchase no more steam locomotives. The steel mills are now buying stokers for metallurgical and chemical furnaces, after several years of being out of the market. The demand for small stokers is noticeable, according to the Riley company's experience with the products of its subsidiaries, the Murphy Iron Works and the Underfeed Stoker Co. of America.

Buffalo

BUFFALO, Oct. 16.

THE Watson Mfg. Co., 63 Taylor Street, Jamestown, N. Y., manufacturer of screens, etc., will commence the erection of a four-story addition, estimated to cost $30,000.

The Pierce, Butler & Pierce Mfg. Corporation, Syracuse, N. Y., with plant at Eastwood, manufacturer of boilers, radiators, etc., has disposed of a bond issue of $2,500,000, a portion of the proceeds to be used for extensions and improvements.

The Water Service Commission, Oswego, N. Y., has plans under way for a one-story municipal hydroelectric generating plant on the Oswego River, 50 x 200 ft., to cost $750,000 with machinery. John A. Bensel, 16 East Forty-first Street, New York, is engineer.

A power house will be constructed by the Pillsbury Flour Mills Co., Minneapolis, Minn., in connection with its proposed new mill at Buffalo, estimated to cost $2,000,000. A. C. Loring is president.

The C. F. Davis Machine Co., Rochester, N. Y., has removed its plant to 150 North Water Street where a new factory has been erected for increased capacity.

The Rochester Taxicab Co., New York Central Station, Rochester, N. Y., will build a two-story automobile service and repair works, 90 x 200 ft., on St. Paul Street, to cost $125,000.

A machine shop for parts manufacture and repairs will be installed in the new two-story automobile service building to be erected by Howard H. Masters, Buffalo, at 87 Virginia Place.

Ohio

CLEVELAND machinery houses report a fair volume of single tool orders and several inquiries for single machines in lots up to a half dozen tools. Dodge Brothers, Detroit, purchased 10 lathes in 12 to 18-in. sizes from a local machinery dealer, and two turret lathes from a local manufacturer. The only activity reported in the railroad field is the purchase by the New York Central Railroad of a 54-in. Niles carwheel lathe for its Ashtabula shops. Among inquiries is one from the Hoover Suction Sweeper Co., North Canton, Ohio, for about a dozen machines. The consensus of opinion in the trade is that business this month shows a gain over September.

Reports from the large Michigan automobile manufacturers indicate that they have been able to increase production considerably this year by improving methods rather than with the addition of equipment. Economies in production have been effected by changing tools and fixtures and tool set-ups, etc., and it is claimed that some car builders have been able to increase their output 25 per cent with only a five per cent increase in equipment.

Two price advances are noted. The Le Blond Machine Tool Co. has advanced its lathes about 15 per cent and the Buffalo Forge Co., has marked up its line of drilling machines from five to seven and one-half per cent.

In Cincinnati a fair volume of both sales and inquiries marked the week. The Pennsylvania Railroad has issued a new inquiry from Philadelphia said to cover its needs up to the first of the year, including 18 lathes and a number of radial drills. The General Electric Co. placed orders for milling machines the past week, and the Ford Motor Co. bought seven Bullard Multi-au-matics and a tool grinder through a dealer for its Hamilton, Ohio, plant. A shipment to Japan is noted. Inquiries for used tools are reported to have increased although it is believed that the stock of the better machines of this class is low.

Increase of capitalization from $1,000,000 to $2,000,000 has been made by the Lowe Brothers Co., paint and varnish makers, Dayton, Ohio. New equipment will be needed for a new six-story structure adjoining the present factory, as well as for the floor being added to one of the present buildings.

The Hope Forge & Machine Co., Mt. Vernon, Ohio, is enlarging its plant by the erection of a new building, 60 x 110

ft., to be used as an erecting department, and another structure, 48 x 125 ft., for storage purposes. The company manufactures gas engines, gas compressors, air compressors and other equipment.

H. J. Walker, formerly of the H. J. Walker Co., Cleveland, has organized the Walker Piston Mfg. Co. and has acquired a factory on East Ninety-third Street for the manufacture of automobile pistons. Considerable machinery has been purchased.

The National Pressed Gear Co., Canton, Ohio, recently incorporated with a capital stock of $250,000, has placed contract for a factory, 50 x 175 ft., on Allen Street, S. E. It will manufacture hot pressed straight and bevel gears under a patented process. A. L. Lewis is president and sales manager; Harry W. McQuaid, vice-president and chief engineer; Ernest Strong, vice-president and superintendent; Harry Nusbaum, secretary, and Frank L. DeCorps, treasurer. The company has opened general offices in the Crane Building, 222 Cleveland Avenue.

The Ohio Crank Shaft Co., Cleveland, manufacturer of automobile crank shafts, is moving into its new plant just completed at 6600 Clement Avenue. This provides 10,000 sq. ft. of floor space, or five times the capacity of the old plant.

The Gabriel Mfg. Co. plans to shortly begin the erection of an addition at 1440 East Fortieth Street, to cost about $35,000.

The Fremont Metal Body Co., Fremont, Ohio, has placed contract for a factory, 60 x 245 ft.

The plant of the Consolidated Mfg. Co., Fernwood Avenue and Lake Shore tracks, Toledo, Ohio, used during the war for the manufacture of shells, has been purchased by Elmer Gerson, who will remodel the building, which contains 80,000 sq. ft. of floor space, and divide it into about 20 units for small manufacturing plants.

Detroit

DETROIT, Oct. 16.

INQUIRIES on machinery of all types have increased in this market the past week and representatives generally feel that October will show a volume of business from ten to twenty per cent greater than any of the three preceding months.

Installation of a central machine shop and supply department, including a salvage plant for reclaiming and repairing supplies and the construction of a new central power house will be started at once by the Bryant Paper Co., Kalamazoo, Mich., as the first part of its extension program, for which a $5,000,000 bond issue was recently approved. About $1,500,000 will be expended on these two projects. Felix Pagenstecher is president.

The Schwarze Electric Co., Adrian, Mich., is building a brick and steel addition, 50 x 100 ft., to its machine shop.

The American Car & Foundry Co., Detroit, has awarded to the A. J. McLean Co. the general contract for an addition to its plant.

The University of Michigan has under way new construction in excess of $6,000,000, including engineering shops and laboratories to cost $750,000.

Announcement is made that the Ira Lee Suction Cleaner Corporation, Detroit, will remove to a new factory at Royal Oak, Mich.

The former plant of the Harron Motor Co., Wayne, Mich., will be occupied by the Detroit Air Cooled Car Co. for the production of its D-A-C car. A building, 70 x 250 ft., is being equipped. W. J. Doughty is president.

Bids will be taken at once for a new steel testing laboratory at Dearborn, Mich., by the Ford Motor Co., Highland Park, Mich., estimated to cost $100,000. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Lansing Pure Ice Co., Lansing, Mich., has plans under way for an addition to double the present capacity. The capital has been increased from $100,000 to $200,000, to provide for the expansion.

The Van Auken Body Co., Pontiac, Mich., has enlargements under way for considerable increase in production. C. M. Van Auken is secretary and treasurer.

The Lansing Bus Co., Lansing, Mich., manufacturer of automobile bodies, has purchased the plant of the Ideal Engine Co. for branch works.

A power house will be constructed at the proposed new three-story plant of the Michigan Canned Food Co., 817 Book Building, Detroit, at Greenville, Mich., estimated to cost $150,000.

In connection with its addition now in course of erection, the Holley Carburetor Co., Vancouver Avenue and the Pere Marquette Railroad, Detroit, will arrange an individual motor drive for practically all equipment. The foundry will be doubled in size and capacity. The extension will cost approximately $60,000.

Indiana

INDIANAPOLIS, Oct. 16.

FOUNDRY and machine shop equipment will be installed by the Super Range Co., Michigan City, Ind., in a local building, for the manufacture of stoves and ranges. R. L. Poe is head.

The Common Council, Broad Ripple, Ind., will soon commence the erection of a municipal electric light and power plant.

The Upland Water Co., Upland, Ind., is planning the construction of an electrically-operated pumping plant in connection with its waterworks system, estimated to cost $50,000.

The Common Council, Hammond, Ind., will commence the erection of a new electrically-operated pumping plant on Columbia Avenue, to cost about $150,000, including machinery.

The Wayne Tank & Pump Co., Canal Street, Fort Wayne, Ind., is preparing for a new one-story works, 50 x 320 ft., estimated to cost $45,000.

The City Sanitary Commission, Indianapolis, has approved plans for the power house to be constructed in connection with the new municipal sewerage disposal plant, to cost with the remaining unit still to be erected, $1,015,000, including machinery. Charles H. Hurd is consulting engineer.

The General Electric Co., Wall Street and Broadway, Fort Wayne, Ind., will erect a new one-story tank shop, 100 x 150 ft., to cost about $30,000.

The Universal Burner Co., Logansport, Ind., is arranging a list of power and other equipment for installation at its plant for the manufacture of fuel-oil burners, comprising motors, steam pumps, air compressors, etc., and shop apparatus.

The United States Encaustic Tile Works, 349 West Sixteenth Street, Indianapolis, will build a two-story addition, 90 x 100 ft., to cost $35,000. S. A. Hastings, company address, is architect.

The Gulf States

BIRMINGHAM, Oct. 16.

PLANS for enlargements are being considered by the Mobile Pulley & Machine Works, Inc., Tennessee Street, Mobile, Ala., including new foundry department for the production of steel castings. A. J. Parsons is president.

The Shirley Machine Co., Eliasville, Tex., is considering the establishment of a branch works at Luling, Tex., for oil well equipment manufacture and repairs.

The Common Council, Lafayette, La., is planning for a bond issue of $144,000, the proceeds to be used for improvements in the municipal electric power plant and waterworks and the installation of additional machinery.

The Houston Terminal Refining Co., Houston, Tex., has plans for an addition to its oil refinery, comprising the former plant of Hoffman & Turnblow. An adjoining site of 25 acres has been secured and a portion will be used for expansion. The company was organized recently with a capital of $500,000. H. M. Duncan and R. R. Kelly are heads.

The Consumers' Ice Co., Amarillo, Tex., will commence the erection of a new ice-manufacturing and refrigerating plant, with initial capacity of 5000 tons.

The National Cast Iron Pipe Co., Tarrant City, Ala., has preliminary plans for an extension to its works. Additional equipment will be installed.

The Crystal Ice & Storage Co., Birmingham, has acquired property for erecting a new ice-manufacturing and refrigerating plant, estimated to cost $90,000 with machinery.

Fire, Oct. 3, destroyed a portion of the No. 3 foundry of the Central Foundry Co., Holt, Ala., with loss estimated at $65,000. Headquarters of the company are at 41 East Forty-second Street, New York.

The Common Council, Fort Myers, Fla., has preliminary plans in progress for a municipal electric light and power house.

The Wichita Motors Co., Wichita Falls, Tex., has perfected plans for the consolidation of manufacturing and assembling operations at its local works. The branch factory at Oklahoma City, Okla., will be discontinued and the equipment transferred to Wichita Falls where enlargements will be made.

The Southwestern Dehydration Co., 409 Andrews Building, Dallas, Tex., recently organized with a capital of $125,000, has inquiries out for equipment for installation in a four-story factory, 75x125 ft., including power and gravity conveyors, boilers and auxiliary equipment, power apparatus, tanks, etc.

The T. W. Smith Lumber Co., Chapman, Ala., is planning to rebuild the portion of its mill recently destroyed by fire with loss of about $75,000.

The Planters & Merchants Mills, 604 Brady Building, San Antonio, Tex., recently formed with a capital of $10,000,000, is preparing plans for a new hydroelectric power house, estimated to cost $100,000, to be used for the operation of a proposed textile mill. J. D. Gilliland is secretary and treasurer.

The Gimmer-Tanner Gravel Co., Columbus, Tex., plans to rebuild its machine and forge shop, recently destroyed by fire.

The Utility Commission, Jacksonville, Fla., has tentative plans for a hydroelectric power house on the St. Marys river in connection with the municipal waterworks. It will cost in excess of $150,000.

The Schlater Light & Ice Co., Schlater, Miss., has tentative plans under way for rebuilding the portion of its plant recently destroyed by fire, with loss estimated at $30,000.

The Consolidated Motor Co., Marianna, Fla., is making inquiries for machine shop equipment, bench tools, etc., for installation at its service works. L. Williams is secretary.

The Central South

ST. LOUIS, Oct. 16.

THE Atlas Tack Co., Fairhaven, Mass., has plans under way for a new one and two-story branch factory, 200 x 500 ft., on the Union Boulevard, St. Louis, estimated to cost $500,000, including equipment. The Widmer Engineering Co., Laclede Gas Building, St. Louis, is engineer.

The McCracken Concrete Pipe Co., Sioux City, Iowa, is considering the erection of a new plant at Cape Girardeau, Mo. J. W. McCracken is president.

The United States Engineer Office, Louisville, will take bids until Oct. 20 for two locomotive type steam air pumps, one single bolt-threading machine, one hack saw machine, one fan blower and four concrete buckets.

The Bell Motor Co., Joplin, Mo., will build a two-story and basement, 50 x 150 ft., service and machine repair works at Fifth and Wall Streets, to cost about $30,000.

The Athletic Mining & Smelting Co., Fort Smith, Ark., has plans under consideration for enlargements and the installation of new retorts, kiln, and other mechanical equipment.

The Shaffer Refining Co., Cushing, Okla., is completing plans for an addition to its oil refinery, estimated to cost $500,000 with machinery.

The Common Council, Pilot Grove, Mo., is planning the construction of a new electrically-operated pumping plant in connection with a new water distributing system, to cost $50,000.

The Cherokee Motor Co., Knoxville, Tenn., will build a three-story addition to its service and repair works, 100 x 150 ft., to cost $75,000 including equipment. Claude S. Reeder is president.

The Department of Public Works, St. Louis, will take bids for the construction of a power, ice and refrigerating plant at the training school at Scott Farm to include boilers, pumps and auxiliary equipment; ice-manufacturing and refrigerating machinery. W. E. Bowen, room 305 City Hall, is engineer.

Denton & Hamilton, Somerset, Ky., are making inquiries for a 16 to 18-in. shaper, new or used.

The Hydro-Electric Co., Oklahoma City, Okla., is perfecting plans for a new hydroelectric power house on the Grand River in the northwestern part of the State. The initial installation will cost in excess of $5,000,000, and ultimate plant more than three times this amount.

The Sinclair Oil Corporation, Carrollton, Mo., will make improvements in the power house at its local plant, to include the installation of new engine and auxiliary equipment.

The Hamilton Machinery Co., 204 Market Street, Chattanooga, Tenn., is in the market for a used 72-in. planer, with 12 to 16-in. bed.

The Merit Veneer & Box Co., Pine Bluff, Ark., recently organized, has leased a local plant to manufacture wire-bound boxes and crates. E. A. Reese and H. F. Buechner, Pine Bluff, head the company.

The William B. Marsh Lumber Co., Elizabethtown, Tenn., will install a boiler, engine and auxiliary power equipment at its power house. Inquiries are being made for the apparatus.

The Wichita Pipe Line Co., Walters, Okla., is planning the construction of a power house at Empire City and an electric pumping plant in the vicinity of Beaver Creek, in connection with a new oil pipe line.

Milwaukee

MILWAUKEE, Oct. 16.

CONDITIONS in the machine-tool trade, from the standpoint of manufacturers, continues to show improvement, which is reflected by a steadily increasing scope of operations. Volume as yet is small, but orders are less spotty. Builders of milling machines still find the automotive industries the best source of business, but buying does not extend beyond urgent needs and rarely does an order cover more than a single machine or from two to three tools. Power farm operating equipment manufacturers are inquiring more freely, lending an aspect of promise for a more active winter and spring demand. In a general way, the iron and steel industries are occupying the best position in more than a year's time. In the orders which have been placed by railroads, local tool shops have shared in a small but encouraging manner. Dealers report more active sales to local metal-working industries and generally throughout Wisconsin, with better prospects than for two years.

The Kohler Co., Kohler, Wis., manufacturer of enameled sanitary ware, farm lighting plants, etc., is asking bids for a four-story addition, 70 x 160 ft., designed by Brust & Philipp, architects, 405 Broadway, Milwaukee. It will be used largely for producing enamels and will be equipped with special crushing, grinding and other equipment. Walter J. Kohler is president.

The Gilson Brothers Co., Fredonia, Wis., has let the general contract for a new gray iron foundry and the remodeling of the present casting shop into an auxiliary building and machine shop addition to the National Construction Co., 490 Virginia Street, Milwaukee. It will cost about $25,000.

The Amherst Electric Co., Amherst, Wis., has been incorporated with a capital stock of $35,000 to erect and operate a commercial light and power plant of the hydroelectric generating type on the Wisconsin River near Mosinee, Wis. The principals are A. G. Kernin, W. H. Knoedler, Charles H. Simpson and Earl A. Boehman, all of Mosinee. Definite plans have not been made public.

The Lerner Metal Specialty Co., Milwaukee, has been organized with $10,000 capital stock to manufacture metal specialties. The principals are represented by Robert A. Hess, attorney, 603 Caswell Block, Milwaukee. A statement will be issued later with respect to plans of the new concern.

The D. J. Murray Mfg. Co., Wausau, Wis., which has let the general contract to the Wisconsin Engineering & Construction Co., local, for a new machine shop, 58 x 228 ft., as reported, is taking bids through E. C. Hall, consulting engineer, 221 Grand Avenue, Milwaukee, for all power and production equipment. The contract for the heating equipment has been let to the American Blower Co.

The Pacific Coast

SAN FRANCISCO, Oct. 10.

A SITE has been obtained by the National Phonograph & Motor Co., Ontario, Cal., for a new plant to manufacture talking-machine motors, spring and electric. T. W. Anderson and W. L. Burt, Ontario, head the company.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Nov. 7, for 100,000 ft. of aircraft cable for the Mare Island Navy Yard, San Francisco.

Fire, Oct. 1, destroyed a portion of the distributing plant of the Union Oil Co., Los Angeles, at San Pablo Bay, Cal., with loss estimated at $250,000. It will be rebuilt.

Louis Skerl, 298 Eleventh Street, San Francisco, will build a two-story factory on Folsom Street, for heavy sheet-metal working. Plans are being completed.

The San Gorgonio Power Co., Banning, Cal., will commence the construction of two hydroelectric power plants at Big Oaks and Camp Comfort, Whitewater River, to cost about $500,000. A third generating plant will be constructed in the same location later, to cost about $400,000 with machinery.

The United States Light & Heat Corporation, Niagara

Falls, N. Y., has taken title to about two acres on Eighty-ninth Avenue, Oakland, Cal., as a site for a new branch plant to manufacture storage batteries, electric lighting and heating equipment. Plans are being drawn. C. O. Mininger is president and general manager.

The Bungalow Fixture Co., Los Angeles, manufacturer of electric lighting fixtures, has removed to its new plant at 818-20 Flower Street. Additional machinery will be installed to more than double the present capacity.

The Public Service Commission, 207 South Broadway, Los Angeles, will take bids until Oct. 31, for two centrifugal booster pump units and motors, specification 626; also for three centrifugal pumps and motors, specification 627. James P. Vroman is secretary.

The Maricopa Irrigation District, D. H. Smith, secretary, Maricopa, Ariz., will receive bids until Oct. 27 for mechanical equipment for a new irrigation district in Pinal County, including derrick towers, pumps, motors, electric substation machinery and transformers.

The Great Northern Railway Co., Spokane, Wash., will build a new ice-manufacturing and cold storage plant at Chelan, Wash., to cost $450,000, including machinery.

The Water and Electric Board, Eugene, Ore., will install a new unit at its municipal electric power plant at Walterville, including turbine, generator and auxiliary equipment; estimated to cost $120,000. C. A. McClain is chairman.

The West Coast Pulp & Paper Co., Salem, Wash., has acquired property at Tumwater, Wash., and will remodel the structures for the establishment of a new pulp and paper mill. A list of machinery to be installed will be prepared. C. M. Miall is president.

The Snow Mountain Water & Power Co., 216 Pine Street, Ukiah, Cal., has plans in progress for new hydroelectric generating plants on Thatcher and Elk creeks, and the Middle Eel river. The total installation will approximate about 12,000,000-hp. with an estimated cost of $6,000,000.

Canada

TORONTO, Oct. 16.

DEMAND for equipment is being maintained and prospective business appears very good. Inquiries from industrial concerns are coming forward and it is the general opinion of those in the trade that buying activities will be considerably strengthened in the near future. Inquiries coming forward are not alone for equipment for replacement purposes but mostly for new plants and additions. The construction of wood-working factories has been prominent the past three or four months and word is now coming forward regarding extensions to several other plants as well as requirements for equipment. The automotive industry is not buying on as large a scale as formerly, but it is known that several plants are being erected for which equipment has not yet been purchased.

With the exception of the order recently placed by the Canadian National Railways for shop equipment, including about 50 tools, no further orders have developed from the Dominion railroads, although it is understood that considerable equipment is needed for both the Canadian National Railways and the Canadian Pacific Railway. Small tools continue in steady demand and local dealers are experiencing a good market for practically all lines.

Kippen & Co., Montreal, are offering $60,000 of 8 per cent cumulative redeemable preferred stock of the Atlas Brick Co., which operates under the direction of the Interprovincial Brick Co. of Canada, at par with a bonus of 40 per cent of common. The proceeds of this sale will be used to purchase equipment in the company's plant to increase the output to 12,000,000 wire cut face brick per year.

The Windsor Machine & Tool Co., Windsor, Ont., is arranging for the erection of a plant at St. Thomas, Ont., to cost $100,000.

The Home Tractor Co. is preparing for the erection of a manufacturing plant at Tillsonburg, Ont.

The general contract for the erection of an oil refinery at Calgary, Alta., to cost $2,500,000 for the Imperial Oil Co., Ltd., Church Street, Toronto, has been awarded to McDonald Brothers, 518 Ninth Avenue West, Calgary.

The Linde Canadian Refrigeration Co., St. Peter Street, Montreal, is erecting a factory at Lachine, Que., to cost $40,000.

The general contract for the construction of a pumping station and pipe line costing $200,000 for the St. Lawrence Pulp & Paper Co., Ltd., Three Rivers, Que., has been awarded to the Foundation Co., Ltd., 511 St. Catharine Street, Montreal.

It is reported that the E. F. Phillips Electric Works, de Gaspe Street, Montreal, will start work soon on the erection of a power cable mill as the second unit of its plant at Brockville, Ont. M. J. Miller, 346 Dorchester Street West, Montreal, is architect.

The Middlesex Motors, 781 Dundas Street, London, Ont., is having plans prepared by J. M. Moore & Co., architects, 489 Richmond Street, for a repair shop and automobile show rooms to cost $50,000. Equipment will be purchased.

STEEL AND INDUSTRIAL STOCKS

Week of Ups and Downs Due to Various Causes

So far as steel and industrial stocks are concerned, the market during the past week has been a curious succession of ups and downs, hovering between the stimulus of a better outlook abroad and the anxiety over extra dividends. Nevertheless, the undertone was firm. Till Monday the resistance point of U. S. Steel has been around 106; before the close of the first day it had touched 108¼, and during the week reached the highest point since autumn, 1919. Visions of stock disbursements developed a fever heat which not only sought new high levels but brought a turnover approached at only one other period this year. There was a display of strength in many industrials during the first few days, but then a reaction set in reflecting the crumbling of Standard Oil shares. However, Saturday was an unusually busy day and offered an opportunity for many issues to rise. American Locomotive established a new high at 136¾, also Baldwin at 140¾. The week's average of 20 industrials was 102.6, or 2.1 above last week.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	53½	57¾	Inland Steel.....	47	47½
Allis-Chal. pf...	101½	103	Int. Har.....	108¼	112
Am. B. S. & Fdy.	82¼	83⅞	Int. Har. pf....	118¾	118¾
American Can...	65½	74⅝	Lackawanna Stl.	81	84
American Can pf.	109¾	110⅞	Lima Loco.....	60¼	63
Am. Car & Fdy..	187¾	201	Midvale Steel...	33¾	35⅜
Am. Car & F. pf.	121⅞	121⅞	Nat.-Acme	14⅝	15½
Am. Locomotive.	127¼	136¾	Nat. Enam. & St.	64½	66⅝
Am. Loco. pf....	120¼	121¼	Nat. E. & St. pf.	101	101½
Am. Radiator...	115	129	N. Y. Air Brake.	36	38⅞
Am. Steel Fdries.	44⅛	45⅞	Nova Scotia Stl.	37	38½
Am. Stl. Fd. pf..	104¾	105	Otis Steel	11	11⅞
Baldwin Loco...	137¼	141⅛	Pitts. Steel pf...	96	96⅝
Baldwin Loco pf.	116⅞	116⅞	Pressed Steel....	89	94
Bethlehem Steel.	74½	76¼	Pressed Steel pf.	104	104
Beth. Steel Cl. B	74¼	77½	Ry. Steel Spring.	122	125¾
Beth. Stl. 8% pf.	112	112½	Ry. Stl. Spg. pf.	117	117
Brier Hill.....	72½	72½	Replogle Steel...	33	35½
Br. Em. Steel...	13	14	Republic	57⅞	61¼
Br. Em. Stl. 1 pf.	75¼	75¼	Republic pf. ...	85⅞	90
Br. Em. Stl. 2 pf.	36¾	38¼	Sloss	49½	51⅝
Chic. Pneu. Tool	82	87¼	Sloss pf.	77	77
Colo. Fuel	32	34¼	Steel of Canada.	62½	70
Crucible Steel...	85	89	Superior Steel...	34	34
Crucible Steel pf.	96	97	Un. Alloy Steel..	37½	38
Deere	74½	74¼	U. S. Steel.....	105⅞	109⅞
Deere pf.	74	75¼	U. S. Steel pf...	121⅞	122⅝
Gen. Electric....	179⅞	188½	Vanadium Steel.	44⅞	47⅝
Gt. No. Ore Cert.	38¼	40¼	Va. I., C. & Coke	54	55½
Gulf States Steel	90	94⅞	W'house Air Br.	99	100½

Industrial Finances

Stockholders of the Electric Alloy Steel Co., one of the constituents of the Atlas Steel Corporation, are being given the opportunity of participating in the underwriting of $250,000 debenture notes, issued in connection with the recent merger of the Electric Alloy company with the Atlas Crucible Steel Co., Dunkirk, N. Y.

The entire issue of the capital stock of the Precision & Thread Grinder Mfg. Co., formerly held by members of the Hudson Motor Specialties Co., Philadelphia, has been sold to an independent party and the Hudson company is in no way connected with the new management.

The Ohio Steel Castings Co., Cleveland, which some time ago acquired control of the Aetna Steel Casting Co., has increased its capital stock to $100,000. John Thompson is president; C. S. Fenton, vice-president; W. I. Thompson, treasurer; John Elden, secretary, and Harry Gresham, general manager.

The Magna Metal Corporation, Doremus Avenue, Newark, N. J., manufacturer of special metals, has been reorganized, following the termination of a recent receivership, with a capital of $100,000. The plant will be continued in operation.

Orders received by the General Electric Co., for the three months ending Sept. 30, totaled $58,914,620, against $41,608,332 for the same quarter last year. This represents an increase of 42 per cent. Total orders for the first nine months of the year are $176,171,194, compared with $135,256,462 in 1921.

September sales of the New York Air Brake Co. amounted to $817,000, representing the largest volume of business for any month in the history of the company. President C. A. Starbuck reported that all plants of the company are now at capacity. August sales exceeded $700,000.

The General Electric Co. has under consideration the calling of its 6 per cent bonds due in 1940, on the next interest date, Feb. 1, at 105. No financing is contemplated in connection with the retirement of these bonds, the amount outstanding amounting to $5,000,000.

The Wyman Gordon Co., Worcester, Mass., drop forgings, has retired and canceled 500 shares of preferred stock, the purchase being made with sinking fund money. The capital stock thereby is reduced from $3,800,000 to $3,750,000, represented by 7500 shares of first preferred, 13,000 shares of second preferred and 17,000 of common stock, the par value of all three classes being $100.

The Otis Steel Co., in its report for the six months ending June 30, last, shows a net loss of $617,225, after charges. Net operating profit amounted to $243,861, against which there were general expenses of $473,113. Reserves for subsidiary companies and income charges brought the net loss to $617,225.

The Allis-Chalmers Mfg. Co., for the quarter ended June 30, reports net profits of $299,796 after taxes, or the equivalent of 4 cents per share on common stock after preferred dividends. This compares with $278,733 in the preceding quarter. Net profits for the first half of 1922 totaled $578,529, which left a small margin after preferred dividends, as against $1,410,069 for the corresponding period in 1921.

The plant and assets of the Premier Motor Corporation, Indianapolis, bankrupt, will be offered for sale by the receiver, the Fletcher Savings & Trust Co., on Oct. 23.

Edward E. Clark and R. E. Gale have been appointed receivers for the Pan-Motor Co., St. Cloud, Minn., operating a local automobile plant. The liabilities are stated as $506,061, and the assets $2,633,385.

Fred E. Hummell has been appointed receiver for the Elgin Motor Car Corporation, Argo, Ill., following the filing of an involuntary petition in bankruptcy against the company. The liabilities are stated to approximate $1,000,000; the assets have not been determined.

T. L. Hausmann, Cleveland, has been appointed receiver for the Templar Motors Co., with plant on Halstead Avenue, Lakewood, Ohio. The liabilities are said to total $1,400,000, and the aggregate assets close to $3,000,000. The plant has been closed for inventory and is expected to resume under the receivership before the end of the month.

A merger has been consummated by the Ramapo Iron Works, Hilburn and Niagara Falls, N. Y., specializing in the production of railroad track material, and the Ajax Forge Co., Blue Island, Ill., and Superior, Wis., manufacturer of similar equipment, under the name of the Ramapo-Ajax Corporation. The new company will be controlled by the American Brake Shoe & Foundry Co., 30 Church Street, New York. The new company has taken title to the Ajax property for a consideration of about $133,000. A bond issue has been sold, totaling $2,250,000, the proceeds to be used for general operations, extensions, etc.

Report of Hydraulic Steel Co.

The annual report of the Hydraulic Steel Co., Cleveland, for year ending June 30 shows an operating loss for the year of $856,274. The company's welding plant made a profit of $84,113. The Canton sheet steel plant reported a loss of $674,381, the Steelcraft plant a loss of $196,486, and the Hydraulic plant a loss of $69,519. The company some time ago sold its Canton sheet steel plant to the United Alloy Steel Corporation, and it is stated that this sale was made at a loss of $3,000,000, but this sale enabled the company to pay off its bank loans and to establish itself on a sound financial basis. The company's statement says that the business of the Hydraulic and welding plants in July and August of this year averaged nearly $500,000 per month as against an average of less than $300,000 per month the previous year. The earnings were slightly in excess of note interest. The balance sheet shows current assets of $2,781,721 and current liabilities of $883,979. The deficit on June 30, including loss on sale of Canton plant, was $1,212,624. The company reports that it recently closed a deal to take over all the pressed steel business of the Sharon plant of the Savage Arms Corporation, totaling about $1,000,000 per year, upon which the company will realize commencing Jan. 1, 1923.

Trade Changes

The Iron Trade Products Co., Pittsburgh, Philadelphia and New York, supplying raw materials to the steel trade, has organized under Delaware charter the Big Four Fluorspar & Ore Co., which has absorbed Crittenden County, Ky., fluorspar properties, including the Big Four Mine, the Love Mine, Deer Creek Mine and Crittenden Springs Mine. Work is being pushed on the further development of these properties, and it is expected that machinery for milling the ores will be installed in the very near future. The general offices of the new company are in the Farmers' Bank Building, Pittsburgh, in the offices of the Iron Trade Products Co., at which place the following officers are to be found: W. J. Strassburger, president; J. L. Hukill, vice-president; Louis J. Adler, treasurer, and Huntington Downer, secretary. The Iron Trade Products Co. will act as executive sales agent for the Big Four Fluorspar & Ore Co. Mine offices will be maintained at Marion, Ky., where Avery H. Reed as vice-president and general manager will be in charge.

The United Electric Co., Canton, Ohio, stationary and portable electric cleaners, upon the resignation of J. F. Kinder, western manager, announces that in the future it will distribute its products through agencies.

The Senter-Robbins-Fox Corporation, 217 Broadway, New York, announces that it has taken Charles T. Baird, formerly of Baird & McCrory, Inc., into the firm. He is admitted as a special partner to have entire charge of the company's newly organized iron and steel department, effective immediately.

The Metallo Gasket Co., New Brunswick, N. J., announces the establishment of a general sales office at 242 Lafayette Street, New York. P. L. Rhodes, W. A. Gormley, L. A. Ward and W. B. Goering comprise the staff of experts available for consultation at the above address.

The Ziv Steel & Wire Co., 4413 West Kinzie Street, Chicago, high speed steel, has opened a branch office at Detroit in charge of George H. Marvin, 108 East Woodbridge Street. Mr. Marvin represented the Atlas Crucible Steel Co. for a number of years in the same territory.

The Conveyors' Corporation of America, 326 West Madison Street, Chicago, has appointed the George W. Fife Engineering Co., 1403 Merchants Bank Building, Indianapolis, as representative for the sale of American trolley carriers in Indiana.

Anton Lucas has resigned from the Metal & Thermit Corporation, with which he has been connected for twenty-five years, and has organized the Liquid Steel Welding Corporation, 401 West Twenty-third Street, Kansas City, Mo., of which he is general manager. He assisted the inventor, Dr. Hans Goldschmidt, in Germany in the early development of the thermit process of welding and in the production of metal by the alumino thermic process. In 1903 Mr. Lucas was sent to this country to introduce the process and to start the manufacture of products related to the process. The new company will manufacture materials and appliances necessary for welding. The name "Liquid Steel" applies to compounds used in heavy welding, especially in railroad shops, where it plays an important part.

The Bridgeport Motor Co., Inc., manufacturer of reduction gear equipment, marine motors, etc., Bridgeport, Conn., reorganized its business the past week, and elected Henry H. Brautigan president and general manager. Mr. Brautigan has been general manager of the company since its incorporation in 1900, and has now taken over the controlling interests of the Watson-Stillman stock in the concern. R. S. Hanover, until recently of New York, has been made secretary of the new company. No radical changes will be made for the present, but it is expected that the company will expand its plant and business in the near future.

The E. L. Essley Machinery Co., machinery dealer, Chicago, has purchased the plant of the George W. Pyott Co., 1401 West North Avenue, and will use the property as a warehouse for the storage of machine tools. Eventually the premises will be improved with new steel-constructed buildings equipped with electric traveling cranes.

The Federal Machinery Sales Co., Chicago, has been appointed exclusive representative in the Chicago district for the Universal Grinding Machine Co. and the Fitchburg Grinding Machine Co., both of Fitchburg, Mass.

The American Carbonic Machinery Co., Wisconsin Rapids, Wis., has effected a physical merger with the Grand Rapids Foundry Co., the controlling interest in which has been held by the American company for several years. The consolidated concerns take the name of the American Carbonic Machinery Co., which has increased its capital stock to $200,000. Otto R. Roenius is general manager.

Krantz works, Westinghouse Electric & Mfg. Co., located for many years in Brooklyn, has been transferred to Mansfield, Ohio.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ⅛ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—53	—38	⅛ in. Butt	—11	+13
¼ in. Butt	—58	—45	¼ in. Butt	—17	— 1
1-3 in. Butt	—60	—47	1-1½ in. Butt.	—20	— 2
2½-6 in. Lap.	—57	—44	2 in. Lap	—14	+ 2
7-8 in. Lap	—53	—30	2½-6 in. Lap.	—18	— 2
9-12 in. Lap	—49	—30	7-12 in. Lap	—10	+ 6

Steel Wire

BASE PRICE* ON NO 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c.
Annealed soft	4.25c.
Galvanized annealed	4.90c.
Coppered basic	4.90c.
Tinned soft Bessemer	5.90c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.50	10.00	IX	7.40	7.15
IXX	13.00	11.25	IXX	8.40	8.15
IXXX	14.25	12.50	XXX	9.40	9.15
IXXXX	16.00	14.00	IXXXX	10.40	10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	37c.
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8½c
Sheet zinc, No. 9 base, casks	9½c. open 10c.

Lead and Solder*

American pig lead	7½c. to 8½c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	25½c.
No. 1 solder	24c.
Refined solder	21¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	8¼c. to 9c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	25c. to 27c.

Old Metals

The market is unchanged and business is fairly active. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

given,

e sold
ls are
ceding
ng of
etails."

20¼c.
20¾c.
17¾c.
27¼c.
23½c.
26 c.

c. per

e over

Masters
$5.80
5.90
6.00
6.15
7.15
8.15
9.15
10.15

$7.00
7.25
7.50
9.00

37c.
50c.

¼c.
c.
¾c.

½c
0c.

½c.
0c.
½c.
4c.
4c.
rd-

5c
5c.
5c.

e.

r.